

1980 INFORMATION SERVICES
INDUSTRY REPORT

INPUT

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INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Continuous-information advisory services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services (software, processing services, turnkey systems, systems integration, professional services, communications, systems/software maintenance and support).

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Market Analysis Program (MAP)

1988 Information Services Industry Report

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Abstract

This report is a comprehensive look at the Information Services Industry in 1987, with growth rate projections for 1988 through 1993. Performance is analyzed for companies that offer processing services, systems software products, applications software products, professional services, turnkey systems, network services, and systems integration.

The number of delivery modes within the Information Services Industry was expanded from a total of four in 1986 to seven in 1987. The additional modes covered in the 1987 report include:

- A division of software products into summary statistics on both systems and applications software products
- A separation of processing services into two delivery modes
 - Processing services defined as remote/batch processing and facilities management
 - Network services
- A separation of professional services into two distinct modes
 - Professional services
 - Systems integration

This segmentation was done in recognition of the rapid growth in these areas and strong interest in more detailed coverage.

For each of these modes of software and services delivery, the report provides market statistics and analyses, revenue distribution by delivery mode, and case studies of public companies in each market.

This report contains 168 pages, including 85 exhibits.



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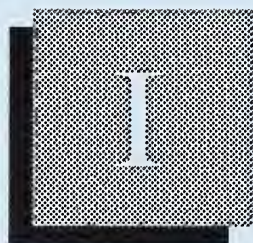
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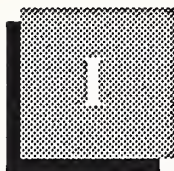
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Introduction





Introduction

A

Purpose

This INPUT Information Services Industry Annual Report is designed for industry managers and financial analysts who wish to gain a fuller understanding of the size, growth trends, and key issues of this rapidly changing industry.

B

Scope

The data contained in this report resulted from the integration of numerous INPUT research programs:

- An extensive, ongoing interview program yielded the primary research data that represent much of this report (see Methodology section). The questionnaire used in this program is included as Appendix C.
- INPUT's Company Analysis and Monitoring Service (CAMS) tracks over 4,000 information services companies. CAMS data was used to verify and supplement data obtained from the interview program outlined below.
- Data on public companies was obtained from INPUT's Vendor Financial Watch (VFW) which tracks the quarterly financial performance of 124 public information services companies. Company data are obtained from annual reports, 10-K reports, and other published sources, supplemented by INPUT estimates when data is not yet available.
- Financial data provided in the VFW include each vendor's revenues and net income, reported on a calendar quarterly basis. Comparisons on performance are provided for:
 - 1987 versus 1986 (year on year, by quarter)
 - 1987 versus 1986 (year on year)
 - Last nine months' results compared to the year earlier period
 - Last six months' results compared to the year earlier period

A list of related INPUT reports is included as Appendix D.

C

Methodology

During the second quarter of 1988, INPUT conducted in-depth interviews with 910 Information Services Vendors, including nearly all of the largest 250 firms. The smallest of the 250 generated about \$20 million in U.S. non-captive 1987 revenues.

Of the total 910 companies, the remaining 660 firms ranged in size from \$250,000 to \$20 million in revenues. Collectively, revenues from these 910 firms represented about 70% of the total information services industry revenues.

For larger vendors for which information was not available, INPUT estimated these revenues from its own contacts and secondary sources. This was done for all identified firms above \$10 million in revenues.

For smaller firms, with revenues below \$10 million (and not measured in the survey), INPUT created its own estimates based on the number of such firms identified in each delivery mode and the expected average revenue of such firms.

The sum of these items produced the initial vendor revenue estimates for 1987. From this figure, INPUT subtracted revenues identified as:

- international (non-U.S.)
- captive
- acquisitions (for growth calculations)

The revenue data in this report, unless otherwise noted, include only the following:

- U.S. revenues—Only revenues derived from products or services sold in the U.S. All foreign revenues are excluded.
- Information services revenue—Revenues from processing services, software products, professional services, turnkey systems, systems integration, and network services.
- Noncaptive revenues—Only revenues available to all vendors in a competitive marketplace are included. Revenues derived from sales to the partners of affiliated organizations are excluded.
- Calendar year revenues—Approximately 30% of the companies have fiscal years that do not coincide with calendar years. Revenues of these companies have been adjusted to a calendar year basis for consistency.

- Rounding to the nearest \$1 million was done to normalize for the lesser degree of accuracy where data was estimated by INPUT.
- Revenues reported by private companies, subsidiaries of larger corporations, computer manufacturers, and CPA firms are generally subject to a wider margin of error than revenues of other companies.

Companies that are not exclusively involved in information services are identified as follows:

- If a division or its subsidiary markets all information services for a company and is generally known by the name of that group, then it is identified by that name rather than the parent's name. An example is Boeing Computer Services Company.
- If more than one division or its subsidiary markets information services, the information is included in, and identified by, the parent's name. An example is Control Data Corporation.
- Organizations are reported according to their legal status as of the end of December 1987.

Companies have been classified according to the mode of service from which they derive the largest proportion of their U.S. noncaptive information service revenues. The modes of service, defined in Appendix A, Section B, include processing services, software products, professional services, turnkey systems, systems integration, and network services.

Revenues for each delivery mode and vertical/cross-industry segment are then separated for closer analysis and five-year forecasts.

INPUT defines the term *industry revenues* as including two separate subsets of data: *user expenditures*, which equate with market size, and *vendor revenues*. For certain delivery modes, vendor revenues and user expenditures are fairly close. However, many microcomputer systems software products, for example, are marketed through indirect distribution channels, such as retail stores, OEMs and VARs, where conversion factors must be included in determining the total market size from vendor revenues. In addition, some software is sold by vendors to other information services sectors such as processing services companies. It could be used in these other information services sectors' data centers and never passed on to an end-user.

The following table shows the various conversion factors used by INPUT to convert vendor revenues to end-user market size figures for each delivery mode:

Application Software	1.18
Systems Software	1.10
Turnkey Systems	.99
Systems Integration	.99
Professional Services	.99
Network Services	.99
Processing Services	.99

Markets can equate with the seven delivery modes; submodes, such as equipment and education/training, or vertical and cross-industry groupings, all of which are reflective of various levels of market segmentation.

For the 1987 user expenditures defined, INPUT projects five-year market growth for each mode and vertical/cross industry market, based on its own analysis of technology, economic outlook, vendor activity, and driving and inhibiting forces affecting each market.

ECONOMIC ASSUMPTIONS:

In developing the five-year forecast, as substantiated in Exhibit I-1, INPUT has incorporated the following economic assumptions regarding the outlook for the total U.S. economy and the impact on the various delivery modes within the information services industry.

EXHIBIT I-1

GNP NOMINAL GROWTH RATE ASSUMPTIONS (Percent)

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real GNP	3.4	3.1	2.8	2.5	2.8	3.0	3.0
*GNP Deflator	3.3	4.5	5.5	5.0	5.0	4.5	4.5
Nominal GNP	6.7	7.6	8.3	7.5	7.8	7.5	7.5

*Year-to-Year Comparisons

INPUT projects that the total information services market will expand at a 17% compound annual growth rate over the next five years, from \$79.6 billion in 1988 to \$174.1 billion in 1993. For 1987, the information services market totaled \$67.4 billion, representing a 20% growth rate over 1986.

The modest decline in the anticipated annual growth rate reflects INPUT's projection of a slowing in real GNP growth over the next two to three years. Real GNP growth is projected to decrease from an anticipated 3.1% annual rate in 1988 to a range of 2.5% to 2.8% over the next three years before improving to approximately current levels of growth in the early 1990s. In addition, the inflation rate, as measured by the GNP deflator, is expected to increase modestly between 1988 and 1989, and then stabilize at a level in-line with our current estimate for 1988 of 4.5%

Primary expectations affecting INPUT's outlook for nominal GNP growth rates over the next five years include a continued slowdown in consumer spending, related to modest increases in real consumer income; further slowing in the rate of increase in federal defense spending, related to the need to reduce the federal budget deficit; product-cycle maturation in certain key technology sectors, such as the low end of the personal computer market and in minicomputers; and higher interest rates, particularly in the near term, reflecting pent-up inflationary cost pressures.

Historically, the information services industry has been more resilient to slowdowns in real GNP growth (reflecting unit shipments) than have companies in the electronic components and equipment sectors. However, the ability to pass on inflationary pricing pressures is more varied in the information services industry, reflecting the particular labor/material mix in the cost structure of the individual delivery modes.

INPUT's forecasted growth rates for the information services industry include the following assumptions concerning the impact of changes in real GNP and inflationary growth rates on the industry's seven different delivery modes.

- **Processing Services:** Includes a variety of applications looked upon as mission-critical services for company operations. With an estimated 50% mix in terms of labor/equipment cost base, processing services companies should be able to pass along much of the labor inflationary cost pressures. The industry has experienced a relatively stable growth rate in recent years following the prolonged downturn in the 1970s related to the decline in traditional timesharing business. However, a more recent trend to outsourcing in several industries has been a counterbalancing force.
- **Network Services:** A 50% mix in the labor/equipment cost base is also applicable for network services. This delivery mode is expected to represent the second-fastest growth rate within the total information services market, fueled by the strong growth of on-line transaction processing and data base delivery systems.

- **Software:** The software markets are impacted by changes in hardware shipments and product life cycles. However, both applications and systems software are viewed as enhancing productivity, which makes these industry sectors relatively immune to a moderate economic slowdown. The increasing consolidation in the industry should enhance the ability to pass along inflationary cost pressures in this industry, which has a very high labor content.
- **Turnkey Systems/VARs:** This delivery mode, which reflects a few larger, well-capitalized turnkey systems companies and a much bigger number of smaller vendors, is probably the most vulnerable to a slowing in the general economy. This also reflects the significant percentage of computer equipment involved in most turnkey systems/VAR sales. The more-fragmentary nature of this industry also reduces the capability to pass along inflationary cost pressures.
- **Systems Integration:** The federal systems integration industry is already reflecting the slowing growth rate in federal work, particularly defense spending. This is expected to continue over the next several years. The commercial systems integration market is in an early growth phase related to the trend to multivendor installation and standard systems and is expected to counter any slowing in the general economy. Inflationary cost pressures could be a negative factor, however, due to the large number of new market entrants and related attempts to improve market share.
- **Professional Services:** The professional services industry has maintained a fairly steady growth rate in recent years, reflecting relative immunity to modest changes in real GNP. This steady growth reflects in part the longer-term nature of many industry contracts and the close, ongoing customer relationships with a high percentage of recurring revenues. However, with the heavy use of fixed-priced contracts, the ability to pass on inflationary labor cost pressures varies considerably among companies based on length of contracts and inflationary pricing clauses within the contracts.

Exhibit I-2 shows INPUT's expectations for real growth from 1988-1993 by each of the seven delivery modes identified within the information services industry. The price deflator applied to nominal growth rates for each delivery mode reflects INPUT's estimates of the percentage of the total inflationary rate increase (as measured by the GNP price deflator), which the individual delivery mode will be able to pass along through price increases.

EXHIBIT I-2

GROWTH RATES BY DELIVERY MODE (Percent)

PROCESSING SERVICES

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real Growth	11.0	7.9	7.0	7.5	6.5	6.9	6.9
Price Deflator	3.0	4.1	5.0	4.5	4.5	4.1	4.1
Nominal Growth	14.0	12.0	12.0	12.0	11.0	11.0	11.0

NETWORK SERVICES

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real Growth	25.0	20.9	20.0	18.5	18.5	17.9	17.9
Price Deflator	3.0	4.1	5.0	4.5	4.5	4.1	4.1
Nominal Growth	28.0	25.0	25.0	23.0	23.0	22.0	22.0

SYSTEMS SOFTWARE

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real Growth	26.7	17.5	16.5	16.0	16.0	15.5	14.5
Price Deflator	3.3	4.5	5.5	5.0	5.0	4.5	4.5
Nominal Growth	30.0	22.0	22.0	21.0	21.0	20.0	19.0

Continued

EXHIBIT I-2 (Continued)

GROWTH RATES BY DELIVERY MODE (Percent)

APPLICATIONS SOFTWARE

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real Growth	20.7	19.5	16.5	15.0	14.0	15.0	15.0
Price Deflator	3.3	4.5	5.5	5.0	5.0	4.5	4.5
Nominal Growth	24.0	24.0	22.0	20.0	19.0	18.0	18.0

TURNKEY SYSTEMS

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real Growth	9.3	9.7	8.2	7.5	6.5	6.7	6.7
Price Deflator	1.7	2.3	2.8	2.5	2.5	2.3	2.3
Nominal Growth	11.0	12.0	11.0	10.0	9.0	9.0	9.0

SYSTEMS INTEGRATION

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real Growth	37.7	21.8	21.1	21.5	21.5	21.8	21.8
Price Deflator	2.3	3.2	3.9	3.5	3.5	3.2	3.2
Nominal Growth	40.0	25.0	25.0	25.0	25.0	25.0	25.0

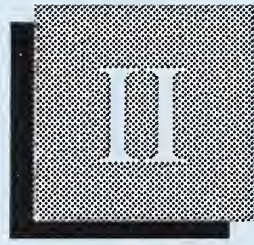
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EXHIBIT I-2 (Continued)

GROWTH RATES BY DELIVERY MODE (Percent)

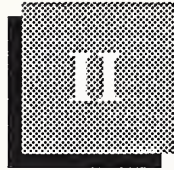
PROFESSIONAL SERVICES

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real Growth	17.4	13.4	12.6	12.0	12.0	12.4	12.4
Price Deflator	2.6	3.6	4.4	4.0	4.0	3.6	3.6
Nominal Growth	20.0	17.0	17.0	16.0	16.0	16.0	16.0



Executive Overview





Executive Overview

A

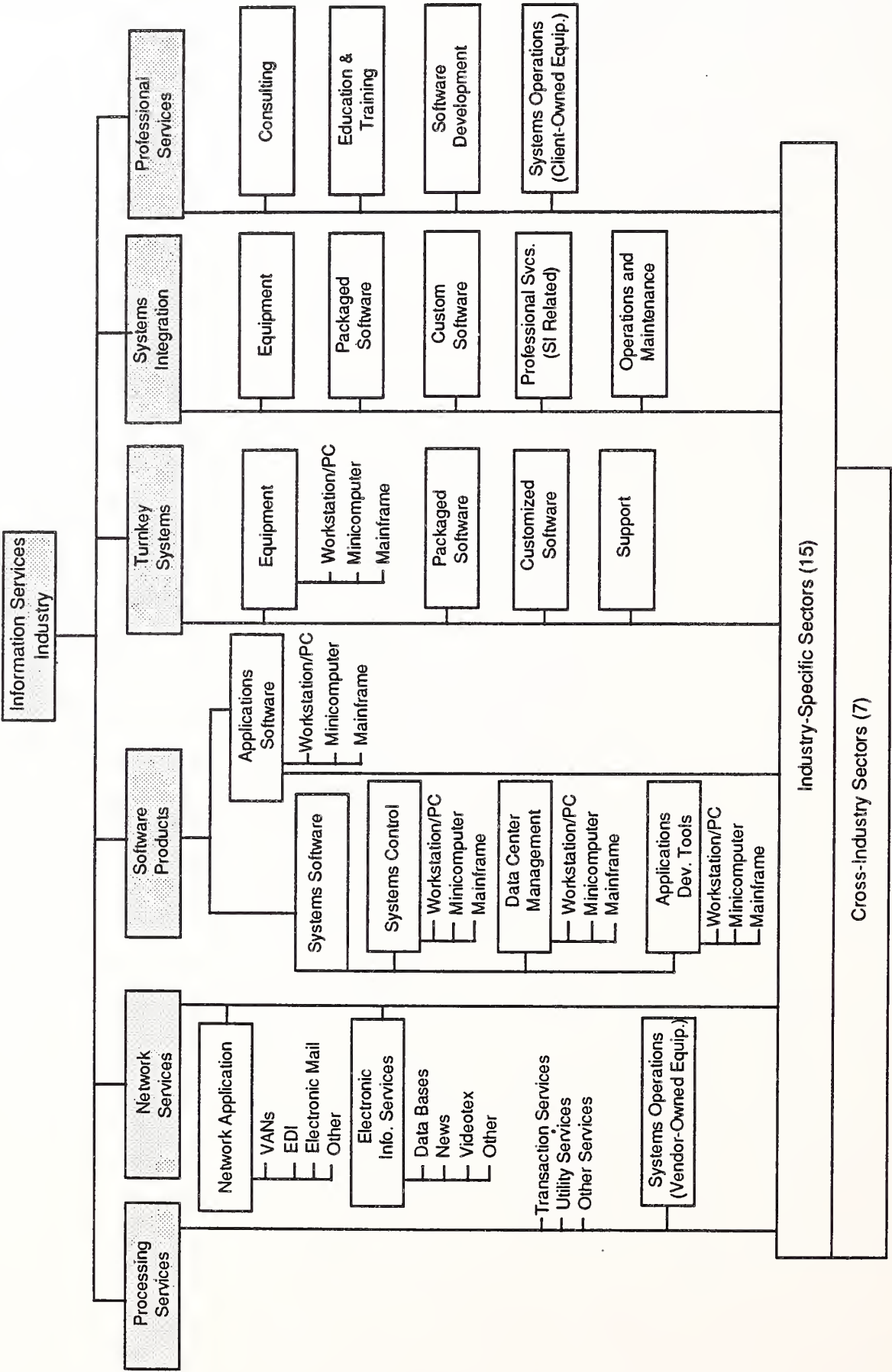
Information Services Industry, 1987

The information services industry structure in 1987, as defined by INPUT, includes seven delivery modes: applications software, systems software, processing services, network services, turnkey systems, systems integration, and professional services. This industry segmentation increased from four delivery modes in 1986, which consisted of software products, processing/network services, turnkey systems, and professional services. The expansion in the number of delivery modes in 1987 reflects the recent strong growth in electronic data base delivery and other network services and systems integration. As such, an increased analytical focus is being applied on these two groups. In addition, INPUT subdivides the information services industry into a number of submodes.

The 1987 INPUT definition of the Information Services Industry Structure is depicted in Exhibit II-1.

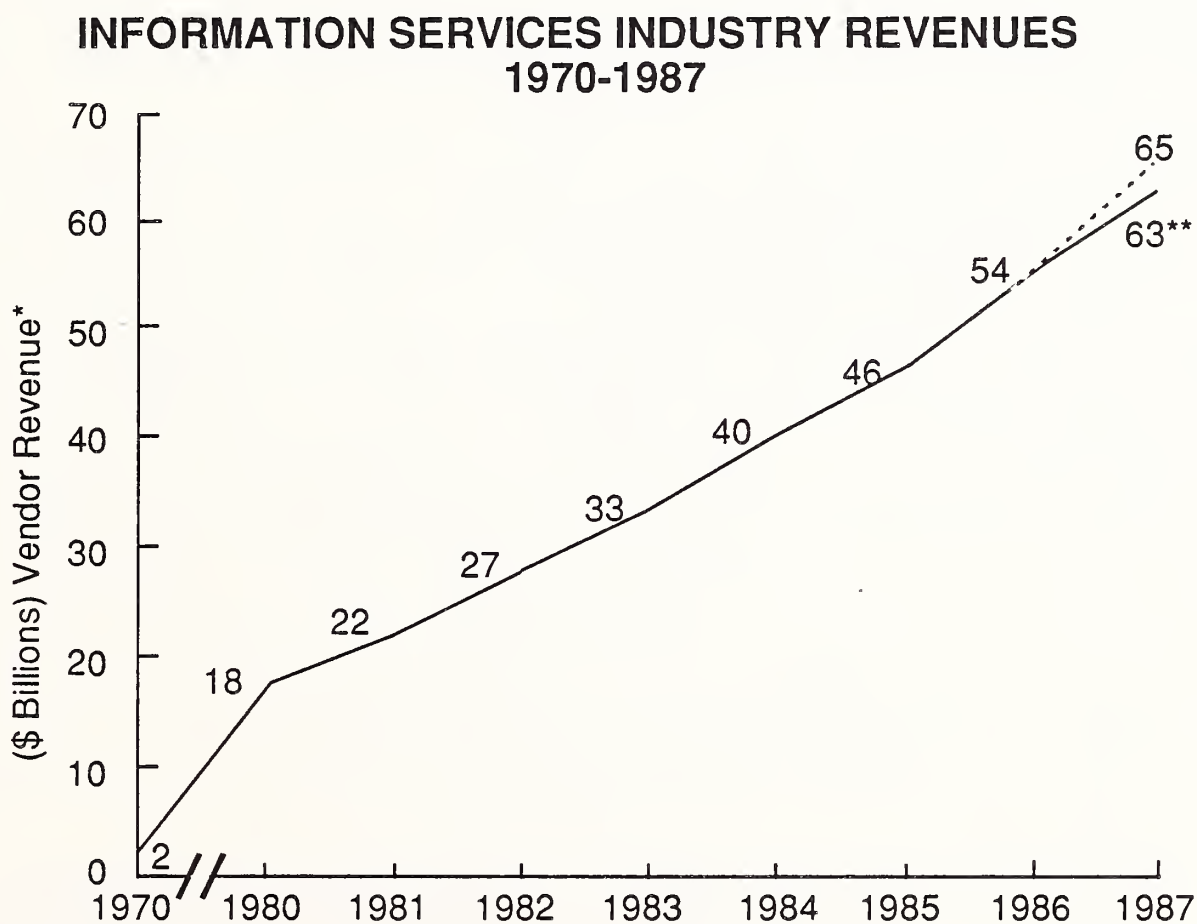
EXHIBIT II-1

INFORMATION SERVICES
INDUSTRY STRUCTURE
1987-1988



The information services industry, defined as vendor revenues, grew 17% in 1987, increasing from \$54 billion in 1986 to \$63 billion, as shown in Exhibit II-2. These figures do not include systems integration hardware, which INPUT began counting for the first time in its 1987 market survey as part of total system integration industry revenues. When systems integration hardware is included, the 1987 information services vendor revenues totaled \$65 billion.

EXHIBIT II-2

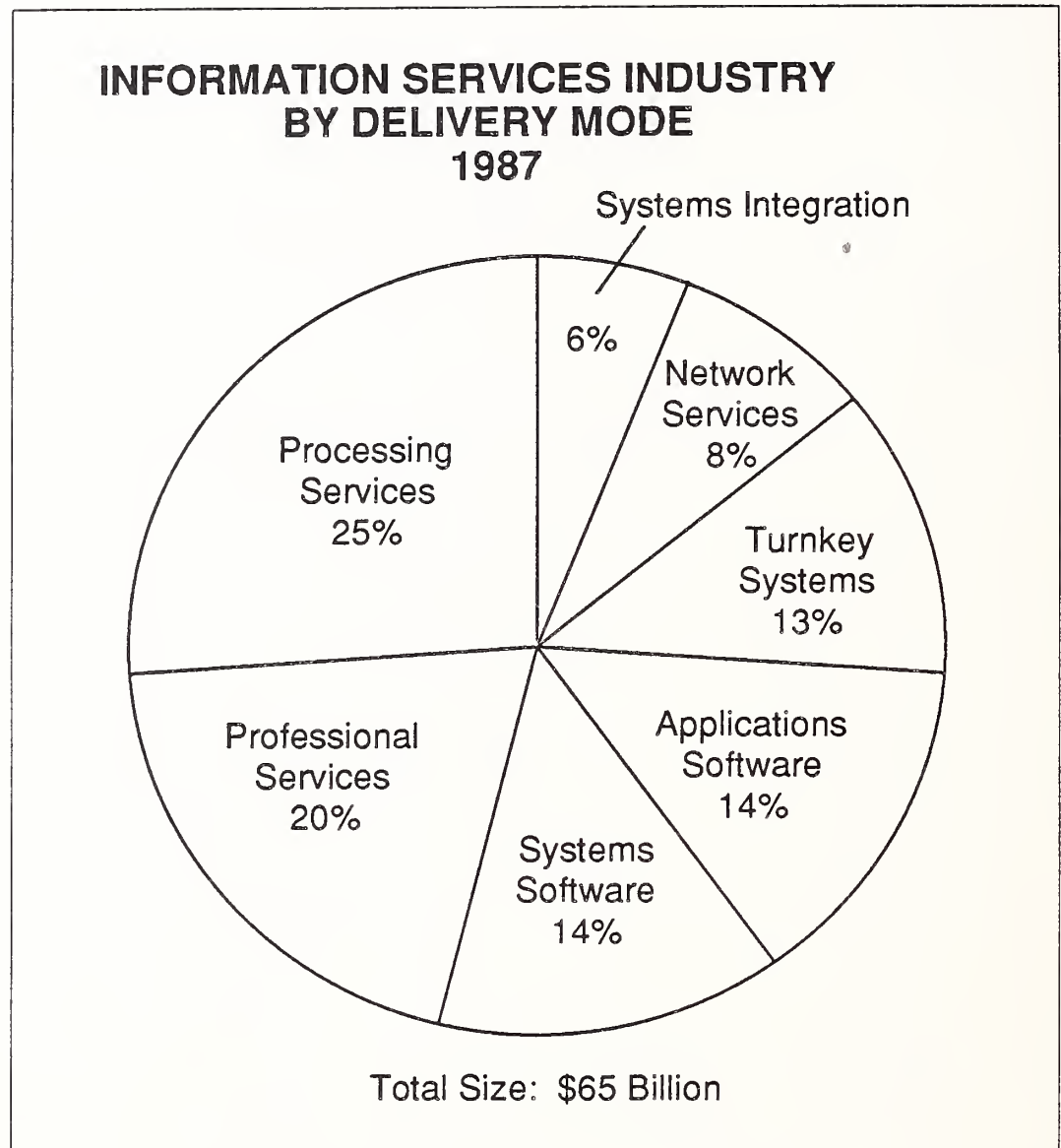


* Note: Definition changes have slightly affected gross market sizes on a year-to-year basis.

** Excluding Systems Integration Hardware

Of the total information services industry in 1987, software (including applications and systems software) represented the largest delivery mode at \$17.5 billion. Processing services with revenues of \$16.3 billion represented the second largest delivery mode. See Exhibit II-3.

EXHIBIT II-3



As shown in Exhibit II-4, in 1987, there were 8,070 companies in the information services industry defined as having revenues predominantly in one of the seven delivery modes which makeup the information services industry. This number increased 7% over the 7,532 companies identified in INPUT's 1987 information services industry group, with start-ups continuing to outpace losses through mergers and other means. (INPUT only identifies companies with annual revenue greater than \$250,000).

With the separation of network services from processing services in the *1988 Information Services Industry Report*, additional companies were identified as predominantly network services providers. Also, the inclusion of the larger VARs (over \$250,000 in revenues) in the turnkey systems delivery mode increased the number of companies identified as primarily turnkey systems suppliers.

Many companies identified as providing products predominantly in one delivery mode often have revenues in other delivery modes as well. For example, a processing services company could also sell applications software. Total vendor revenues in this report for a particular delivery mode represent the combination of revenues from companies that are identified as principally in that delivery mode and revenues in the same delivery mode from companies that may be identified as principally a supplier of products in another of the seven delivery modes.

The software products group showed the highest growth rate in the number of new companies, an estimated 10% increase. The number of professional services/systems integration companies grew by an estimated 5%. The remaining delivery modes showed relatively little growth.

EXHIBIT II-4

KEY INFORMATION SERVICES INDUSTRY REVENUE STATISTICS—1987

Type of Company	Number of Companies*
Processing Services	1,900
Network Services	325
Systems Software Products	1,190
Applications Software Products	1,780
Turnkey Systems	1,255
Systems Integration	*300
Professional Services	1,320
TOTAL	8,070

*Several companies which formerly identifies themselves as professional services companies now prefer a systems integration designation. However, many of these are actually systems integration sub-contractors. The number of prime contractors is considerably less than identified as systems integration companies in this survey.

B**Information Services
Industry Issues and
Trends**

INPUT considers the following to be key issues and trends that will continue to impact the information services industry over the next several years:

- Improving equipment price/performance and related price elastic demand factors should continue to be major stimulants for information services industry revenues.
- In the current worldwide economic environment, knowledge has become a key competitive factor. Information services, a knowledge-based industry, is a key area for improving productivity in several areas of an economy, including research, education, engineering design, manufacturing, and administration. Information services is also one area where the U.S. has developed a leading competitive position.
- However, with the close relationship between shipments of hardware platforms and growth rates in PC software products and the recent revenue shortfalls experienced by small-format Winchester drive manufacturers and some of the personal computer manufacturers, there is some concern about a possible peaking in the strong demand for personal computers. Nevertheless, PC/workstation applications software represents less than 6% of the total information services market. The latest generation of laptop computers—incorporating 16-bit and 32-bit microprocessor technology, lighter packaging, and improved screen readability—could stimulate the home/business computer market, particularly in the appeal of the portable computer to the professional. Also, an expected increase in releases of applications for the OS/2 operating system in 1989 will help stimulate the business microcomputer market by providing more-efficient connectivity solutions.
- The workstation market should remain on a strong growth path for the next several years, along with UNIX systems software, providing relative price/performance benefits in the mid-level distributed processing environment. The recent shortfalls in revenues recorded by public minicomputer manufacturers beginning in early 1988 reflects in part the market share inroads made by the workstation manufacturers.
- The mainframe market, which has already appeared to have reached a relatively mature status in recent years, is likely to continue to moderate slightly in anticipation of the initial IBM "Summit" introduction expected sometime in the 1990-1991 period.
- A significant economic slowdown in the U.S. is a real possibility by mid-1989, particularly in the electronic component and equipment sectors, which would variously impact the information services markets as previously indicated. However, at this time, INPUT's information services projections for the next five years reflect a scenario of relatively modest decline in real GNP growth.

- The increasing European/Japanese presence in the electronics sectors in the U.S. markets will continue to affect pricing and overall competitive pressures. However, the U.S. continues to demonstrate a strong competitive position in software services.
- A relatively high level of vendor consolidation will likely continue. This consolidation reflects increasing levels of competition in the industry along with greater merger and acquisition activity, related, in part, to perceived bargains in this group and expectations of above average industry growth rates.
- Within the software and turnkey industry segments, in particular, there are increasing levels of competition related to new market entrants, product life cycle maturation, and the greater interest of the large computer systems vendors in pursuing the applications software markets.
- The trend from single delivery mode to multidelivery modes by individual companies will continue, with an emphasis on providing total solutions. This development will be particularly evident among professional services companies and computer systems companies expanding into software products and systems integration.
- The information services industry (vendor revenues), now at \$65 billion, cannot continue to sustain an average annual growth rate of 15-20%, which is significantly above the general industry growth rates, well into the late 1990s. This is due in part to the difficulty of supporting the infrastructure of an industry dependent upon highly skilled personnel, which could be in increasingly short supply. A skilled personnel shortage could also be a source of inflationary pricing pressures.

C

Public Information Services Vendor Analysis

INPUT's sample of public companies includes information services companies only, as opposed to other types of companies (e.g., accounting, publishing, or manufacturing) that also provide information services. In order to be included in a particular delivery mode, these companies must generate most of their revenue from one delivery mode, such as software products, so that the sample can be used to determine the performance of companies in each of the seven delivery modes tracked in INPUT's public company index. Due to this requirement, INPUT's sample index of public companies with information services revenues does not include all of the largest information service providers.

The number of delivery modes in this index was increased from four in 1986 to seven in 1987 by assigning software companies into applications and systems software, professional services into government and commercial professional services and processing services companies into processing services vendors and electronic information services vendors.

INPUT's total universe of information services vendors, both public and private, also includes systems integration vendors for the first time in 1987. This delivery mode, however, was not included in the public vendor index for 1987 because very few independent public companies at that time derived the majority of their revenues from systems integration sources. Previously, systems integrators were included in the professional services category.

Of the sample companies included in INPUT's index of public information services vendors, as shown in Exhibit II-5, revenue growth was 22% in 1987, compared to 20% in 1986 and an average of 21% for the five-year period from 1983 through 1987.

The slight improvement in 1987 growth over 1986 related primarily to strong increases in the rate of growth of systems software vendors (56% in 1987 compared to 44% in 1986) and applications software vendors (30% in 1987 compared to 23% in 1986). In addition, the fortunes of the public turnkey systems vendors have been on a modest recovery path since 1985, when the growth rate of the turnkey systems industry slowed to 7%. In 1986, turnkey systems vendor growth was 10%, and 15% in 1987.

As shown in Exhibit II-6, net income of the public information services vendors increased by 43% in 1987, compared to 40% in 1986, and an average rate of increase of 22.4% for the five year period from 1983 through 1987. The low period in profitability for the public information services industry was in 1985, when net income showed a negative rate of growth of 6%.

EXHIBIT II-5

PUBLIC INFORMATION SERVICES VENDORS' REVENUE GROWTH RATES
(PERCENT)

		Q1	Q2	Q3	Q4	TOTAL
PROCESSING/NETWORK SERVICES VENDORS (33)	1983	19	15	17	17	17
	1984	19	20	14	16	17
	1985	15	16	16	16	16
	1986	16	16	17	18	17
	1987	15	14	15	18	15
ELECTRONIC INFORMATION SERVICES VENDORS (6)	1983	63	67	65	89	72
	1984	91	79	102	46	76
	1985	29	30	22	30	28
	1986	34	49	40	43	42
	1987	38	33	31	29	32
SYSTEMS SOFTWARE VENDORS (21)	1983	27	25	27	41	31
	1984	42	45	53	33	43
	1985	32	20	12	24	22
	1986	34	51	53	39	44
	1987	55	55	51	61	56
APPLICATION SOFTWARE VENDORS (22)	1983	21	27	42	36	32
	1984	81	41	30	14	37
	1985	-2	22	6	12	10
	1986	29	17	24	24	23
	1987	31	39	34	20	30
GOVERNMENT PROFESSIONAL SERVICES VENDORS (13)	1983	13	13	14	8	12
	1984	9	10	7	9	9
	1985	10	13	12	18	13
	1986	18	17	19	10	16
	1987	14	12	12	16	13
COMMERCIAL PROFESSIONAL SERVICES VENDORS (12)	1983	22	48	68	68	52
	1984	51	37	30	26	35
	1985	31	26	25	18	25
	1986	11	19	22	28	20
	1987	26	22	21	18	22
TURNKEY SYSTEMS VENDORS (23)	1983	16	24	37	36	29
	1984	39	47	33	29	37
	1985	14	10	4	1	7
	1986	3	6	17	14	10
	1987	19	16	10	17	15
TOTAL INFORMATION SERVICES VENDORS (130)	1983	18	20	26	26	23
	1984	29	29	23	20	25
	1985	15	16	12	14	14
	1986	16	19	23	20	20
	1987	23	23	20	24	22

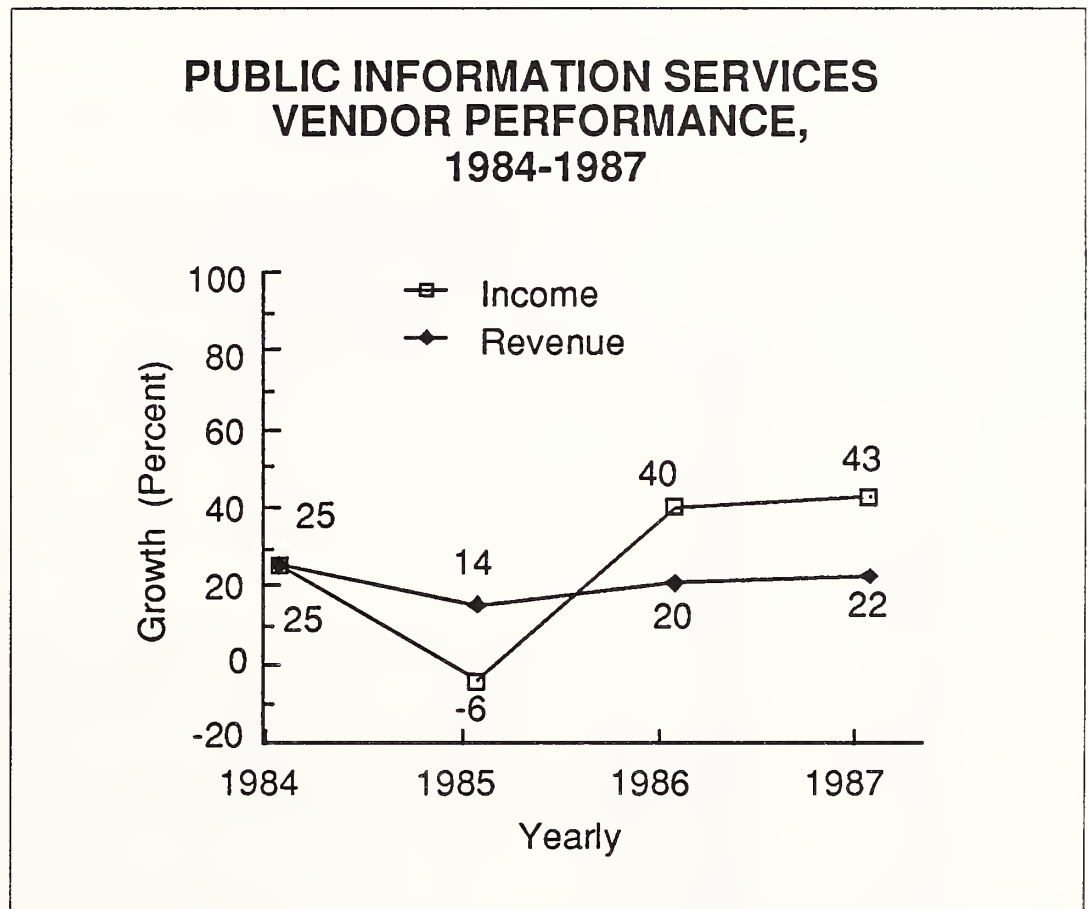
EXHIBIT II-6

PUBLIC INFORMATION SERVICES VENDORS' NET INCOME GROWTH RATES
(PERCENT)

		Q1	Q2	Q3	Q4	TOTAL
PROCESSING/NETWORK SERVICES VENDORS (33)	1983	12	-15	-25	-114	-34
	1984	-44	23	-135	998	-1
	1985	134	34	1016	21	107
	1986	-2	-30	3	55	5
	1987	37	92	48	9	39
ELECTRONIC INFORMATION SERVICES VENDORS (6)	1983	86	95	86	69	82
	1984	59	36	30	20	34
	1985	40	17	5	16	19
	1986	1	13	41	42	24
	1987	55	69	25	40	45
SYSTEMS SOFTWARE VENDORS (21)	1983	-9	23	24	469	148
	1984	63	31	79	62	61
	1985	64	59	2	38	37
	1986	56	43	55	41	48
	1987	40	86	59	78	66
APPLICATION SOFTWARE VENDORS (22)	1983	87	70	87	21	45
	1984	225	-25	-27	-72	-16
	1985	-102	48	-15	155	-7
	1986	11835	-53	85	50	53
	1987	-365	544	10	-12	-16
GOVERNMENT PROFESSIONAL SERVICES VENDORS (13)	1983	-11	-28	14	31	0
	1984	29	29	15	67	37
	1985	31	30	1	-29	2
	1986	24	47	33	49	38
	1987	-4	-75	67	39	4
COMMERCIAL PROFESSIONAL SERVICES VENDORS (12)	1983	50	187	87	22	66
	1984	-6	24	-37	14	-4
	1985	42	-40	23	-51	-10
	1986	-176	21	-23	165	-36
	1987	171	101	868	-80	303
TURNKEY SYSTEMS VENDORS (23)	1983	-22	1	93	80	36
	1984	121	91	20	26	51
	1985	-74	-88	-76	-136	-96
	1986	8	155	154	394	376
	1987	131	53	42	89	74
TOTAL INFORMATION SERVICES VENDORS (130)	1983	3	1	29	8	10
	1984	28	37	-14	51	25
	1985	2	-8	16	-22	-6
	1986	13	7	43	94	40
	1987	18	80	48	35	43

The quarterly revenue growth rate comparisons over the past three years indicate a rather steady increase beginning in the first quarter of 1986, leveling somewhat in the first nine months of 1987, and accelerating in the fourth quarter of 1987. In contrast, net income growth, after a sharp dropoff in the fourth quarter of 1985, exhibited a sharp acceleration beginning in the third quarter of 1986 and extending through the second quarter of 1987, with declining but very respectable growth rates in the third and fourth quarters of 1987 of 48% and 35%, respectively. Fourth quarter revenues in 1987 from the public information services vendors grew 22% compared to a 20% growth rate in the fourth quarter of 1986. These results, shown in Exhibit II-7, demonstrate a continuation of the strong recovery for the industry that has occurred during the past two years.

EXHIBIT II-7



The systems software sector demonstrated the highest growth rate in revenue in 1987, at 56%, of all of seven delivery modes tracked by INPUT. Net income was also up 66%. Particularly strong performers in both revenue and net income growth in 1987 were Adobe Systems, Computer Associates, Informix, Microsoft, Morino Associates, Oracle, and Pansophic.

The second-fastest growth rate in revenue came from the applications software vendor group, which showed a 30% increase in revenue in 1987.

However, the growth rate in net income for applications software vendors was a negative 16%, which was attributed to losses taken at MSA related to a change in accounting methods and losses sustained at Silver-Lisco. Excluding these companies, net income growth for the public applications software products companies in 1987 was up 82%. Particularly strong performance among public applications software vendors in 1987 was demonstrated by Autodesk, Innovative Software (now part of Informix), Lotus Development, MacNeal-Schwendler, and Software Publishing.

Commercial professional services vendors have experienced a higher growth rate than the government sector for the past several years. Growth rates for 1985, 1986, and 1987 were 25%, 20%, and 22%, respectively. Earnings of the commercial professional services companies were also up strongly in 1987.

Revenue growth in the government professional industry has remained relatively stable for the past few years. During 1984, growth slowed to 9%; however, in 1985, 1986, and 1987, growth was 13%, 16%, and 13%, respectively. Bolt Bernanek and Newman had the highest growth rate (42%) of all government professional services vendors during 1987. However, earnings in the government professional services group exhibited a much more fluctuating pattern. Growth in earnings was 0%, 37%, 2%, 38%, and 4% during the past five consecutive years. The 4% growth rate in 1987 was primarily the result of Bolt Bernanek and Newman's \$18.3 million loss taken during the second quarter due to an acquisition cost expensed as in-process technology. Without that charge, earnings per share at Bolt Bernanek and Newman increased 22%.

In the fourth quarter of 1987, however, the government professional services group demonstrated particularly healthy growth in both revenue and net income. Revenue grew 16% during the quarter, net income increased 39%. These results reflected strong individual company performances, with the exception of BDM International, whose revenue decreased slightly from the fourth quarter of 1986.

Turnkey systems revenue grew 7%, 10%, and 15% respectively in 1985, 1986, and 1987. Earnings for the group fell 96% in 1985, jumped 376% in 1986, and grew 74% in 1987. Companies exhibiting strong revenue and income growth in 1987 included ASK Computer Systems, Auto-trol Technology, Barrister Information, C3, Cerner, Comptek Research, Computer Consoles, Computer Design, Computervision, Gerber Scientific, HBO, and Interleaf. Some companies, such as CompuTrac, Libra Systems, and Systems Integrators, exhibited problems in terms of both revenue and earnings.

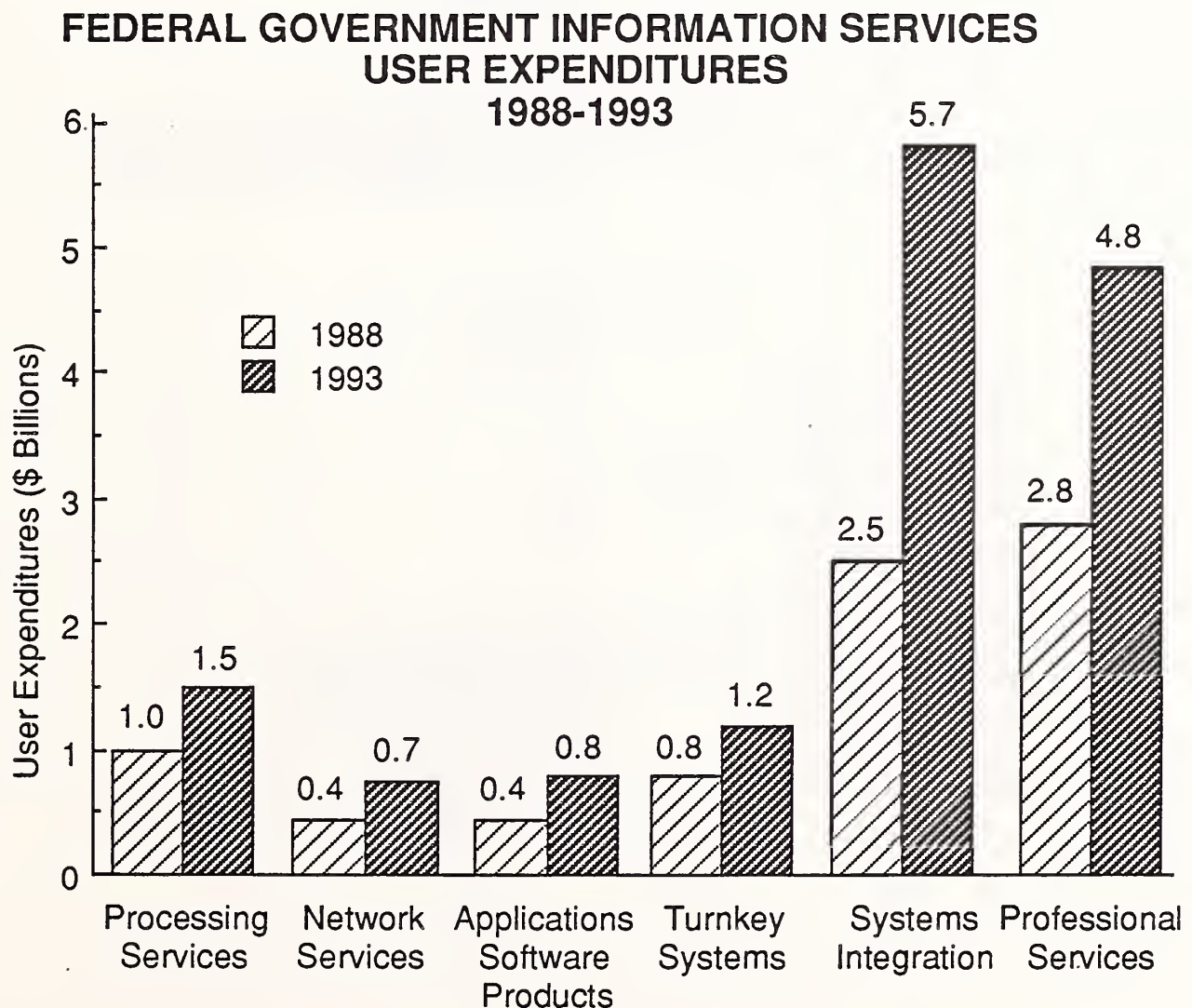
Processing services industry revenue grew by 15% in 1987. This figure compared with a 17% growth rate in 1986, 16% in 1985; and 17% in both 1983 and 1984. Fourth quarter 1987 revenue expanded by 18%. Net income in the processing services industry grew by 39% in 1987 compared to 5% in 1986, 107% in 1985, and with negative growth rates in 1983 and 1984. Fourth quarter 1987 processing services net income increased by 9%, compared to a 55% expansion in net income in the fourth quarter of 1986.

D

Commercial versus Federal Information Services Markets

Federal government expenditures for information services are expected to grow from \$7.9 billion in 1988 to \$14.7 billion in 1993 for a compound annual growth rate (CAGR) of 13% over the next five years, as shown in Exhibits II-8 and 10.

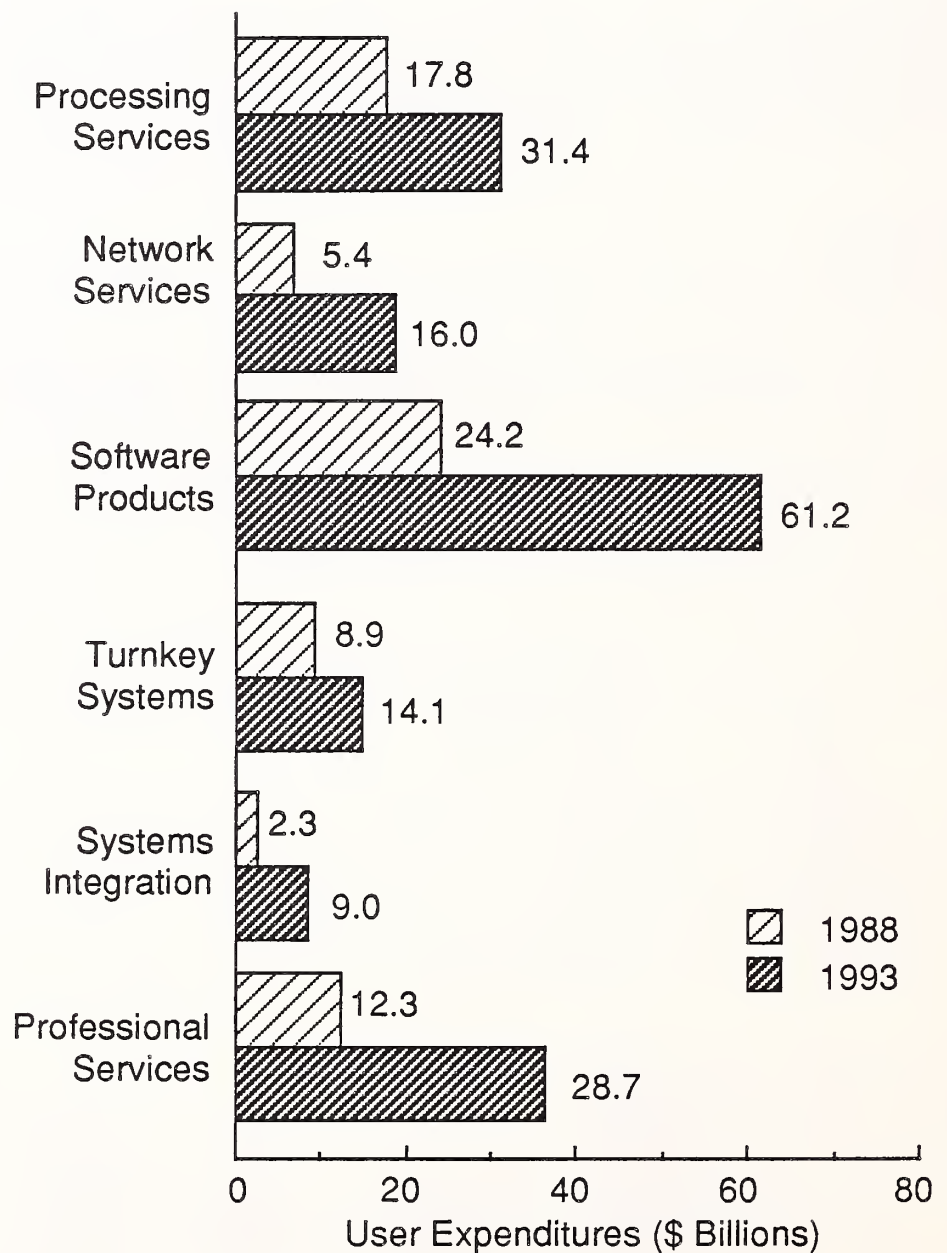
EXHIBIT II-8



In comparison, as Exhibits II-9 and 10 show, user expenditures in the commercial sector of information services are expected to grow at a 17% CAGR from \$72 billion in 1988 to \$159.5 billion in 1993.

EXHIBIT II-9

COMMERCIAL INFORMATION SERVICES USER EXPENDITURES BY DELIVERY MODE, 1988-1993



Professional Services procured by the federal government are described further in Chapter X of this report.

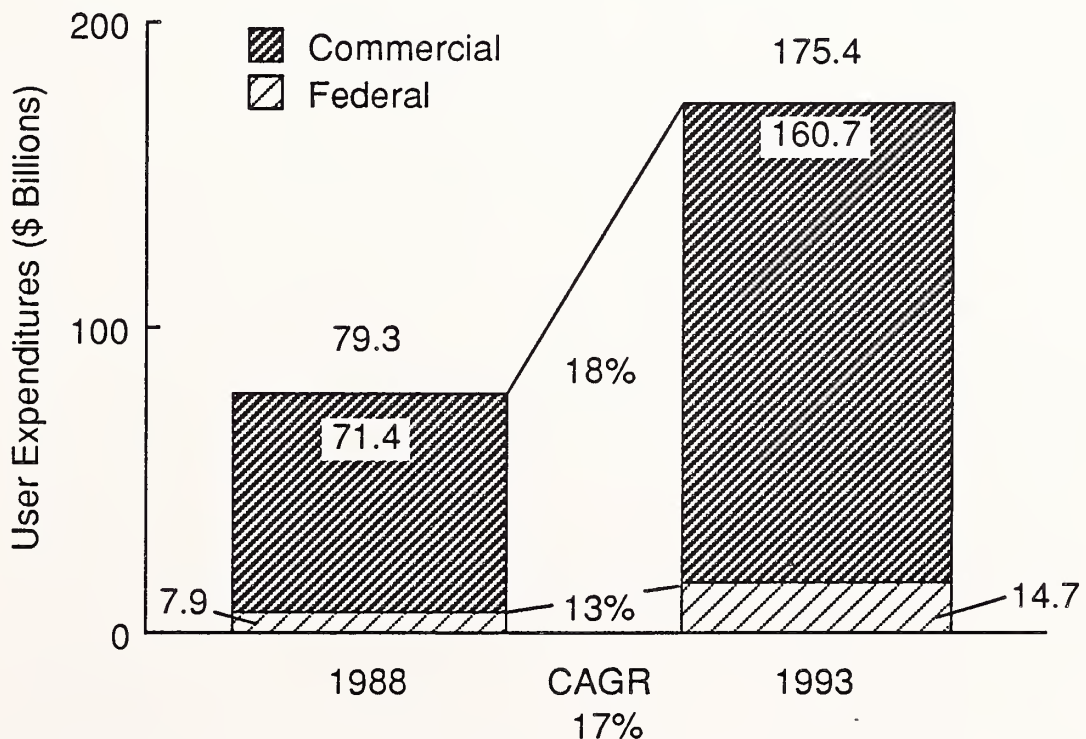
The fastest-growing service mode for federal users is systems integration. Federal expenditures for systems integration are expected to expand at a CAGR of 18% over the next five years.

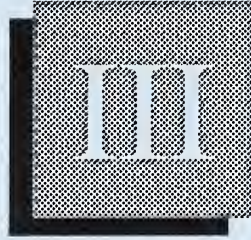
The systems integration market data in INPUT's *Information Services Industry* report in 1987 included only software expenditures. However, in designating systems integration as a separate delivery mode in its 1987 market survey, INPUT also included hardware expenditures in sizing the total systems integration market.

Exhibit II-10 depicts INPUT's projected combined expectations for the commercial and federal government markets from 1988 to 1993.

EXHIBIT II-10

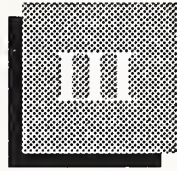
FEDERAL GOVERNMENT AND COMMERCIAL INFORMATION SERVICES USER EXPENDITURES—1988-1993





Information Services Marketplace





Information Services Marketplace

A

Overview

INPUT defines the U.S. information services market as end-user expenditures, as opposed to U.S. information services industry or vendor revenues. Both market and vendor revenues, however, include INPUT's expectations for real growth (unit growth) plus inflationary expectations or current dollar figures.

In 1987, user expenditures for the information services market totaled \$67.4 billion. This figure includes systems integration hardware of approximately \$2 billion, which was not included in INPUT's 1986 Information Services survey. By including systems integration and hardware, total expenditures for information services in 1986 were \$56 billion, a 20% increase from 1985.

For the 1988-1993 time period, the information services market is projected to increase at a CAGR of 17% from an estimated \$79.6 billion in 1988 to \$175.4 billion in 1993.

Applications and systems software, combined, at \$20.5 billion, represented the largest information services market in 1987. The largest single sector of the information services market in 1987 was processing services, with \$16.8 billion in revenues compared to \$14.8 billion in 1986, for an annual growth rate of 14%. The processing services market is projected to grow from \$18.9 billion in 1988 to \$32.9 billion in 1993, for a CAGR of 12%. The continuing trend to in-house processing, related in part to decreasing computer systems costs, is currently being offset by increased levels of outsourcing of specific data processing applications as well as facilities management functions.

The market for systems software products in 1987 was \$9.9 billion compared to \$7.6 billion in 1986, for an annual growth rate of 30%. The strong growth in systems software is being fueled by the demand for minicomputer-based relational data base management systems software and applications development tools. For 1988, INPUT is projecting a systems software products market of \$12 billion, with growth to \$30.7 billion in 1993, for a CAGR of 21%.

User expenditures for applications software products in 1987 totalled \$10.6 billion compared to \$8.6 billion in 1986, for an annual growth rate of 24%. Over the next five years, INPUT is projecting a CAGR in applications software products of 19%, from \$13.1 billion in 1988 to \$31.7 billion in 1993. The moderation in growth over the next five years relates to INPUT's expectations of a peaking in the product life cycles of many personal computer applications, which have been a major factor in the strong recent growth in the applications software market. However, considerable market potential exists in a number of industry-specific, vertical markets.

The market for professional services in 1987 totaled \$12.7 billion compared to \$10.6 billion in 1986, representing an annual growth rate of 20%. Over the next five years, INPUT anticipates that the professional services market will continue to expand at a fairly steady rate, averaging 17% from an expected \$15.1 billion in revenue in 1988 to \$33.5 billion in revenue in 1993.

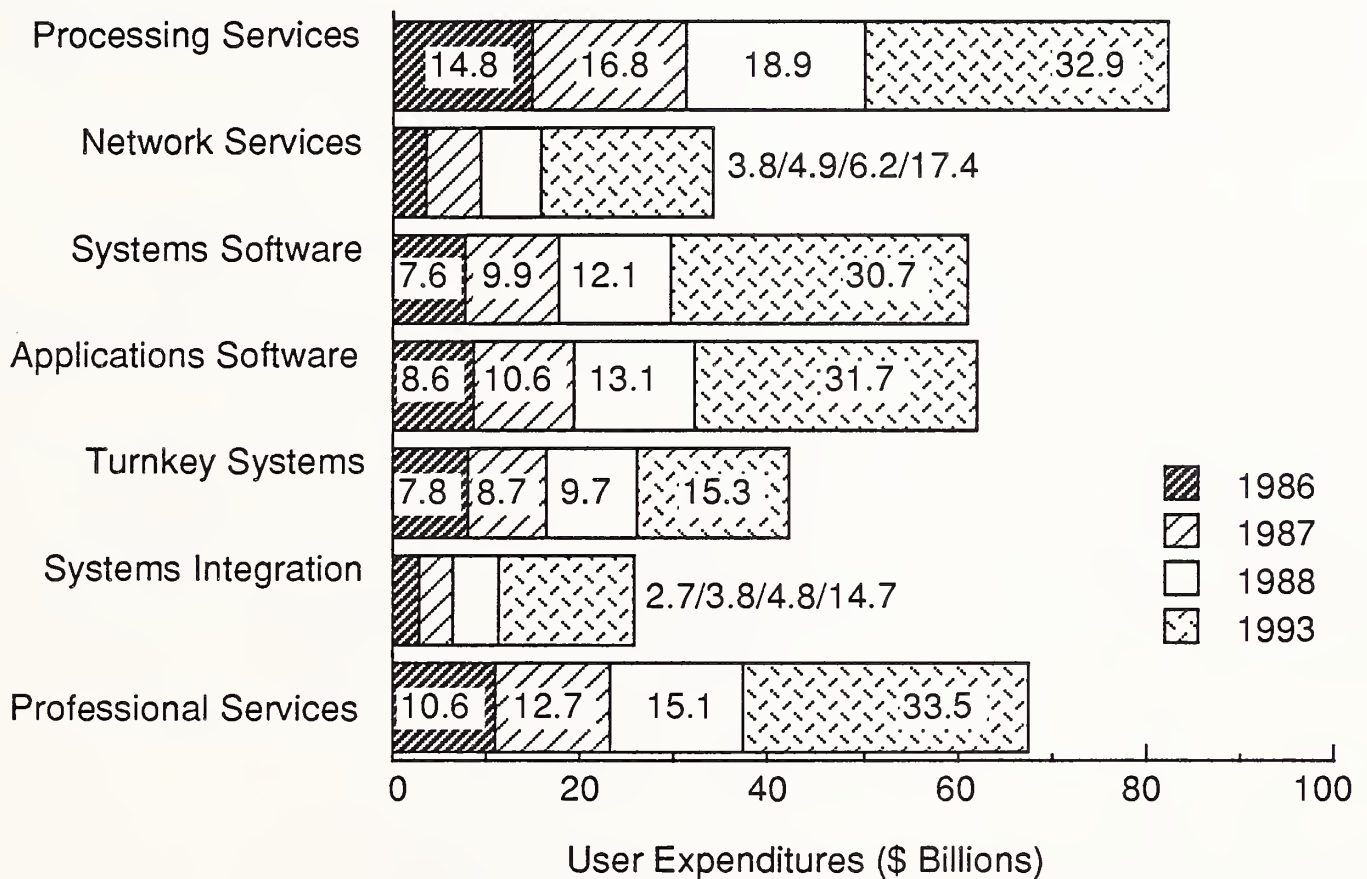
Market expenditures for turnkey systems increased from \$7.8 billion in 1986 to \$8.7 billion in 1987, for an annual rate of increase of 11%. Over the next five years, INPUT anticipates a 10% CAGR, from \$9.7 billion in expenditures in 1988 to \$15.3 billion in 1993.

Expenditures for network services increased from \$3.8 billion in 1986 to \$4.9 billion in 1987, for an annual increase of 28%. Over the next five years, user expenditures are expected to increase from \$6.2 billion in 1988 to \$17.4 billion in 1993, for a CAGR of 23%. Some moderation is expected, in particular, in the on-line data base delivery market, which has been in a high-growth initial phase in recent years. However, with the anticipated entry of the Bell operating companies and AT&T into the integrated information services delivery modes, the potential market for on-line delivery of information services could expand significantly.

The strongest growth market in information services over the next five years is expected to be in systems integration. As shown in Exhibit III-1,

EXHIBIT III-1

INFORMATION SERVICES MARKET BY DELIVERY MODE 1986, 1987, 1988, AND 1993



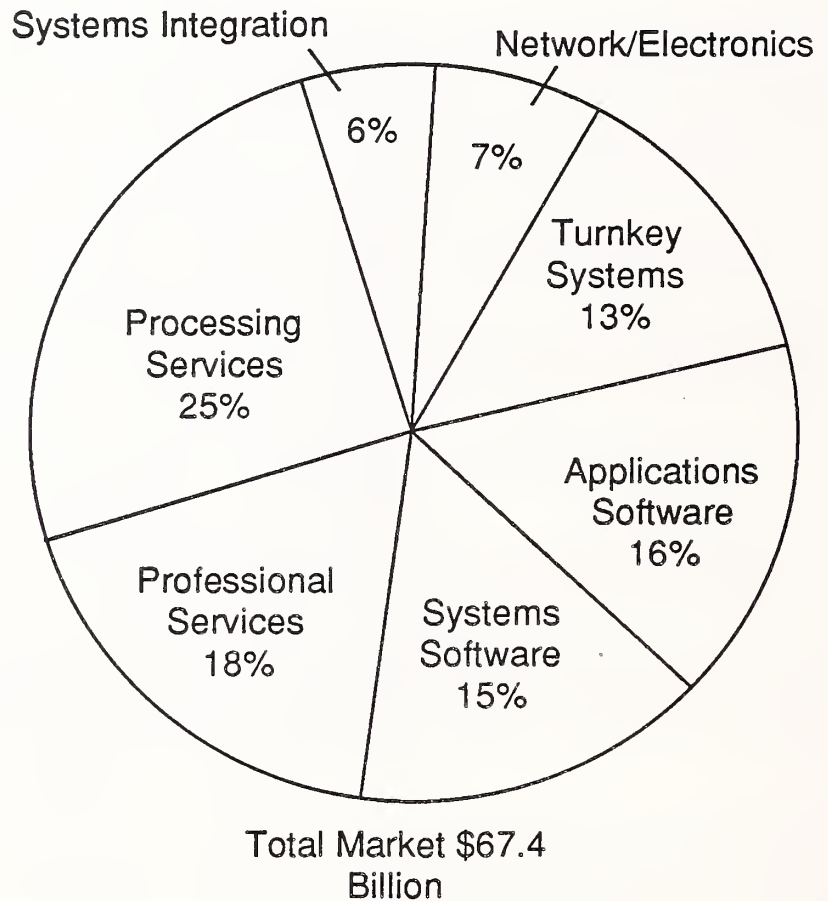
from a \$4.8 billion expenditure level in 1988, the systems integration market is expected to increase to \$14.7 billion in 1993, for a CAGR of 25%. In 1986, the market for systems integration was \$2.7 billion, and \$3.8 billion in 1987, reflecting an annual growth rate of 40%. Fueling the systems integration market is the increasing demand for multivendor product connectivity in both the commercial and federal government market segments.

B

Market Share by Delivery Mode

In 1987, as shown in Exhibit III-2, processing services represented the largest share (25%) of any single information services market. However, the total software market—combining both applications and systems software—is larger, at 31% of the total information services industry market.

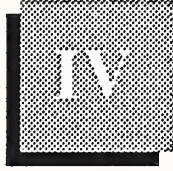
EXHIBIT III-2

**INFORMATION SERVICES MARKET
BY MODE OF SERVICE
1987**



Public Company Analysis





Public Company Analysis

A

Sample of Public Companies by Service Mode

INPUT's sample of public information services vendors includes 130 companies:

- Application Software Services Vendors - 22
- Systems Software Services Vendors - 21
- Processing Services Vendors - 33
- Network/Electronic Information Services Vendors - 6
- Turnkey Systems Vendors - 23
- Government Professional Services Vendors - 13
- Commercial Professional Services Vendors - 12

B

Revenue and Net Income Performance, 1984-1987

As a group, the 1987 revenue growth of the public information services companies tracked by INPUT, at 22%, was slightly above the 20.8% average growth for the five-year period from 1984-1987. See Exhibit IV-1.

Growth in net income in 1987, at 43%, however, was considerably in excess of the 22.4% average growth between 1984-1987, as shown in Exhibit IV-2. INPUT reports the annual revenue and net income of the companies in its public company data base on a calendar basis.

On a quarterly basis, revenue growth was consistent with the annual rate, with the only significant deviation in the third calendar quarter, which can reflect a seasonality factor due in part to a vacation-related business slowdown, particularly in European business.

The strongest sector growth rate was from the systems software vendors, with a 56% increase in revenues from 1986-1987 and a 66% improvement in net income. (As previously mentioned, systems integration was

EXHIBIT IV-1

PUBLIC INFORMATION SERVICES VENDORS' REVENUE GROWTH RATES
(PERCENT)

		Q1	Q2	Q3	Q4	TOTAL
PROCESSING/NETWORK SERVICES VENDORS (33)	1983	19	15	17	17	17
	1984	19	20	14	16	17
	1985	15	16	16	16	16
	1986	16	16	17	18	17
	1987	15	14	15	18	15
ELECTRONIC INFORMATION SERVICES VENDORS (6)	1983	63	67	65	89	72
	1984	91	79	102	46	76
	1985	29	30	22	30	28
	1986	34	49	40	43	42
	1987	38	33	31	29	32
SYSTEMS SOFTWARE VENDORS (21)	1983	27	25	27	41	31
	1984	42	45	53	33	43
	1985	32	20	12	24	22
	1986	34	51	53	39	44
	1987	55	55	51	61	56
APPLICATION SOFTWARE VENDORS (22)	1983	21	27	42	36	32
	1984	81	41	30	14	37
	1985	-2	22	6	12	10
	1986	29	17	24	24	23
	1987	31	39	34	20	30
GOVERNMENT PROFESSIONAL SERVICES VENDORS (13)	1983	13	13	14	8	12
	1984	9	10	7	9	9
	1985	10	13	12	18	13
	1986	18	17	19	10	16
	1987	14	12	12	16	13
COMMERCIAL PROFESSIONAL SERVICES VENDORS (12)	1983	22	48	68	68	52
	1984	51	37	30	26	35
	1985	31	26	25	18	25
	1986	11	19	22	28	20
	1987	26	22	21	18	22
TURNKEY SYSTEMS VENDORS (23)	1983	16	24	37	36	29
	1984	39	47	33	29	37
	1985	14	10	4	1	7
	1986	3	6	17	14	10
	1987	19	16	10	17	15
TOTAL INFORMATION SERVICES VENDORS (130)	1983	18	20	26	26	23
	1984	29	29	23	20	25
	1985	15	16	12	14	14
	1986	16	19	23	20	20
	1987	23	23	20	24	22

EXHIBIT IV-2

PUBLIC INFORMATION SERVICES VENDORS' NET INCOME GROWTH RATES
(PERCENT)

		Q1	Q2	Q3	Q4	TOTAL
PROCESSING/NETWORK SERVICES VENDORS (33)	1983	12	-15	-25	-114	-34
	1984	-44	23	-135	998	-1
	1985	134	34	1016	21	107
	1986	-2	-30	3	55	5
	1987	37	92	48	9	39
ELECTRONIC INFORMATION SERVICES VENDORS (6)	1983	86	95	86	69	82
	1984	59	36	30	20	34
	1985	40	17	5	16	19
	1986	1	13	41	42	24
	1987	55	69	25	40	45
SYSTEMS SOFTWARE VENDORS (21)	1983	-9	23	24	469	148
	1984	63	31	79	62	61
	1985	64	59	2	38	37
	1986	56	43	55	41	48
	1987	40	86	59	78	66
APPLICATION SOFTWARE VENDORS (22)	1983	87	70	87	21	45
	1984	225	-25	-27	-72	-16
	1985	-102	48	-15	155	-7
	1986	11835	-53	85	50	53
	1987	-365	544	10	-12	-16
GOVERNMENT PROFESSIONAL SERVICES VENDORS (13)	1983	-11	-28	14	31	0
	1984	29	29	15	67	37
	1985	31	30	1	-29	2
	1986	24	47	33	49	38
	1987	-4	-75	67	39	4
COMMERCIAL PROFESSIONAL SERVICES VENDORS (12)	1983	50	187	87	22	66
	1984	-6	24	-37	14	-4
	1985	42	-40	23	-51	-10
	1986	-176	21	-23	165	-36
	1987	171	101	868	-80	303
TURNKEY SYSTEMS VENDORS (23)	1983	-22	1	93	80	36
	1984	121	91	20	26	51
	1985	-74	-88	-76	-136	-96
	1986	8	155	154	394	376
	1987	131	53	42	89	74
TOTAL INFORMATION SERVICES VENDORS (130)	1983	3	1	29	8	10
	1984	28	37	-14	51	25
	1985	2	-8	16	-22	-6
	1986	13	7	43	94	40
	1987	18	80	48	35	43

not tracked in a separate delivery mode index). The high performance in this group reflected, in particular, the strong growth in the minicomputer-related relational data base management systems markets, with a 126% improvement in revenue for Oracle Corp. and a 97% increase in revenue for Informix Software Corp. In addition, Computer Associates continued to strengthen its market share by acquisition as the leading independent vendor in the software products market.

The second-highest revenue growth rate was registered among the publicly traded electronic information companies, with a 32% increase in revenue from 1986-1987 and a 45% increase in net income during the same time period. Particular strength in this group was registered by CCX Network, with a 101% increase in annual revenue and a 73% increase in net income, CUC International, with a 40% revenue expansion and a 10% increase in aftertax income, and Telerate, with a 45% increase in revenues and a 74% expansion in net income.

The third-highest growth rate in revenue was from the applications software vendors sector, with a 30% annual increase in revenue from 1986-1987. However, applications software net income was down 16%, due largely in part to changes in accounting practices and associated cumulative charges to net income by three companies in the INPUT group.

The slowest annual revenue growth rate, at 13%, was exhibited by the government professional services group, which reflected in part a slowing in government spending for professional services/systems integration programs in 1987.

Net income quarterly growth rates of the public information services vendors over the past five years have been very erratic, which in part suggests the highly competitive nature of the information services industry, and rapid product obsolescence.

C

Case Study Analysis of Selected Success Stories

This sector analyzes public information services firms that have demonstrated above average revenue and net income growth for their sector in 1987.

1. Applications Software Products

Applications software product companies address either vertical market segments such as banking, manufacturing, insurance, and medical industry sectors, or cross-industry segments such as office systems. The average revenue growth rate for public companies in applications software products tracked by INPUT in calendar 1987 was 30%. Average net income for the same group of twenty-two companies, however,

declined by 16%. Eighteen out of the twenty-two companies showed growth in net income of 14% or higher for calendar 1987. However, the overall decline for the group was negatively impacted by substantial declines in net income registered by Cybertek, which markets insurance policy management products; Genesee Corp., which addresses the beer and wine industry; Management Science America (MSA), a leading factor in financial applications; and Silvar-Lisco, which is in the CAE/CAD applications software markets. Losses at MSA reflected in part a change in accounting methods used for revenue recognition, and Silvar-Lisco's loss partly reflected a charge to earnings from the disposal of certain computer equipment and capitalized purchase software as well as a change in revenue recognition methods.

Particularly successful companies in applications software products in 1987 were those that had established a strong position in the larger niche markets. Autodesk is one that has continued to demonstrate revenue and earnings growth in excess of 50% for several years. This high growth relates to Autodesk's dominant position in PC/workstation-based CAD applications and to its product partnership with several hundred key VARs in the architectural and mechanical engineering vertical markets.

The 1987 net profit margin for the applications software products group was 5%. Excluding MSA's results, the applications software products group attained a 13% profit margin.

a. Autodesk, Inc. (2320 Marinship Way, Sausalito, CA 94965)

Autodesk, Inc. develops and markets computer-aided design and drafting (CAD) software products for microcomputers and 32-bit workstations. As of May 1988, over 150,000 of the company's primary product, AutoCAD®, had been sold.

Autodesk's revenue grew 51% in 1987 to the \$79 million level, with net income increasing 77% during the same time period, to \$20.5 million.

The company's continuing success relates to its strong market position for CAD solutions on most standard PC/workstation hardware platforms in the domestic and international markets, its strong partnership with the leading VARs in vertical market segments, and its initial successful penetration of the potential \$150 million government market for PC/workstation-based CAD solutions.

Autodesk's strategy in the development of AutoCAD and its other products has been to offer a low-cost, easy-to-use CAD package that runs on virtually all computers supporting the MS-DOS operating system, as well as on certain engineering workstations supporting UNIX or similar operating systems. Autodesk also recently announced support of the Apple Macintosh.

Autodesk currently markets the following software product:

AutoCAD, the company's principal product, was introduced in November 1982 and has since been enhanced through a series of releases. AutoCAD automates the design and drafting process by enabling users to interactively create, store, and edit a variety of drawings. This drawing information may be exchanged with other applications software, data bases, and mainframe CAD systems. According to Autodesk, AutoCAD provides desktop computer users many of the benefits of more-expensive mainframe- or minicomputer-based CAD systems at a substantially lower cost.

Recent acquisitions made by Autodesk include the following:

- On April 14, 1988, the company acquired 80% equity interest in Xanadu Operating Company, Palo Alto, CA.
 - Xanadu is a developer of the Hypertext System, which stores, manages and manipulates text and graphical interfaces.
- In March 1987, the company purchased Cadetron Inc. of Atlanta, GA.
 - Cadetron was the developer of The Engineer Works, a mainframe-level solids modeling program for desktop computers. Autodesk plans to re-release the product as AutoSolid (TM) in the second quarter of fiscal 1989.

b. MacNeal-Schwendler Corporation (815 Colorado Boulevard, Los Angeles, CA 90041)

MacNeal-Schwendler is a leading marketer of finite element analysis (FEA) software tools. It markets a complete line of products for mechanical computer-aided engineering (MCAE) applications on microcomputers, engineering workstations, and mainframes.

Its principal product is MSC/NASTRAN, CAE software, which is a structural analysis software program used by designers and engineers in the aerospace, automotive, biomedical, robotics, and other industries. Mechanical engineers and designers use this software tool to analyze the strength characteristics and structural integrity of products prior to their manufacture. FEA can significantly reduce product development costs by reducing the need to build and test prototypes.

In 1987 MacNeal-Schwendler's revenue grew 28%, reaching \$34.5 million; and net income increased by 29% to \$9.1 million.

MacNeal-Schwendler attributes its steady growth to the strong usage and continuing market acceptance of its principal product, MSC/NASTRAN, as well as more recent sales strength in its personal computer products.

The company's strategy is to continue to expand its line of engineering analysis software and to strengthen its strong market share position by continuing to port its software to leading hardware platforms in the mechanical CAE market for finite element analysis.

In January 1988, MacNeal-Schwendler announced the first finite element analysis package to be implemented on the Macintosh (TM) II and SE models.

c. Policy Management Systems Corporation (P.O. Box 10, Columbia, SC 29202)

Policy Management Systems Corporation (PMSC) provides application software products, processing services, and associated support services to the property, casualty, group life, and health insurance companies and independent agents and adjusters. During 1987, the company expanded its target market to include federal and state governments. Its first government contract was a three-year federal government Housing and Urban Development (HUD) contract. Under the contract, PMSC will perform appraisals and related information-gathering services for HUD-sponsored lending institutions that provide loans to buyers of manufactured housing. The agreement involves the use of appraisal services offered by PMSC's information services and Comp-U-Claim, PMSC's property claim estimating product.

In 1987 PMSC's revenue increased by 20% to \$180 million, and net income expanded by 24% to the \$17 million level. Policy Management System's results in 1987 were positively impacted by several acquisitions, including Allied Research, Oregon and Consolidated Insurance Services, Avant Health Management Group, Jensen and More, and Nationwide Computer Services.

In January 1987, PMSC also entered into a complementary marketing assistance agreement with IBM under its Industry Marketing Assistance Program (IMAP). Through IMAP, PMSC works with IBM to market IBM hardware and systems software and PMSC applications software and professional services to the property, casualty, group life, and health insurance industries.

PMSC management attributes its 1987 growth in revenue primarily to an increase in the number of systems licensed, a greater volume of services performed for customers, the addition of revenues from recent business acquisitions, and to a lesser degree, price increases.

In March 1987, PMSC announced it had begun a six-year, \$100 million plus development project involving a new generation of systems (called Series III) incorporating IBM's Systems Application Architecture (SAA) as a standard. It is being designed to offer relational data base manage-

ment, intelligent workstations, artificial intelligence/expert systems technology, image processing, advanced networking, and portability functions.

PMSC's target market for its products and services is the more than 3,100 property and casualty insurance companies, over 4,000 group life and health providers, and independent agents and adjusters in the U.S. and Canada. PMSC also offers its property and casualty products in 10 foreign countries. PMSC currently has approximately 500 property and casualty clients and 150 group insurance clients in seven countries.

d. Software Publishing Corporation (1901 Landings Drive, Mountain View, CA 94303)

Software Publishing develops and markets microcomputer-based applications software packages that are designed to increase the productivity of business professionals in the office environment as well as provide integrated word processing, file management, spreadsheet, and communications packages for the low- to medium-power users. The company's current product lines include PFS®, for both entry-level and experienced computer users, and Harvard (TM) for specialized applications. SPC has currently sold over four million copies of its software products worldwide.

Software Publishing's calendar 1987 revenues, at approximately \$44 million, represented a 73% increase over 1986 calendar revenues, and aftertax income improved by 390% to reach \$6.5 million.

This strong growth in revenue and earnings for Software Publishing in 1987 relates to the introduction and strong acceptance in the corporate market of a new generation of office systems applications products in late 1986—the PFS series and the Harvard Presentation Graphics and Harvard Total Project Manager specialty software products.

SPC's traditional customers have been small- to medium-sized businesses. Beginning in 1986, sales to large corporations, a newly targeted market, increased significantly.

SPC acquired Harvard Software in August 1985. Two of SPC's current products (Harvard Total Project Manager II (TM) and Harvard Graphics) are enhancement of products acquired with Harvard Software.

2. Systems Software Products

Systems software products' offerings enable the computer/communication system to perform basic functions. Particular groups of systems software include: systems control products, data center management products, and application development tools.

The 56% annual revenue growth rate in this sector, the highest of all delivery modes tracked by INPUT, reflects the strength in data base management, systems, and application development tools (particularly CASE), as well as certain sizable acquisitions. Some of the larger acquisitions included that of UCCEL, ISSCO and Software International by Computer Associates; and Professional Computer Resources and Remote Data Systems by Pansophic.

The systems software products' group profitability for 1987 was approximately 12%. The most profitable companies of the group were Adobe Systems (23%), Duquesne Systems (22%), and Microsoft (20%).

a. Adobe Systems (1585 Charleston Road, Mountain View, CA 94039)

Adobe Systems provides systems software products used in laser printers, typesetters, and other raster output devices to print integrated text and graphics.

Adobe Systems' revenue grew 136% in 1987, reaching \$37.8 million. Net income grew 140% to \$8.6 million.

Adobe Systems ties its success to the acceptance of desktop publishing. In 1987, revenue growth also reflected the significant expansion in licensee agreements with major computer systems/printer vendors for its PostScript® page description language. Growth in revenues in 1986 reflected more the strength of its licensing agreement with Apple. In 1987, Adobe also signed such other major corporations as IBM, DEC, and Fujitsu as licensees of PostScript®. As such PostScript® has become the standard page description language used in desktop publishing applications.

Adobe Systems' strategy is to provide software for the rapidly growing desktop publishing market in three key areas:

- The PostScript® language interpreter, the company's principal product, executes page descriptions generated from applications programs that support the PostScript® language to produce documents containing multiple typefaces and graphics. Currently, over 30 different printers incorporate the PostScript® interpreter language. Additionally the language is supported by close to 200 software firms and has become a de facto standard for controlling laser printers.
- The company also develops typefaces used with laser printers. Because of the large PostScript® installed base and because expanding the library of typefaces is technically difficult and time-consuming, the barrier to entry has increased for companies with competitive language interpreters.

- In 1987, Adobe also introduced DISPLAY PostScript,™ which expands the page display language to the computer display market.

b. Computer Associates International, Inc. (Computer Associates Building, 125 Jericho Turnpike, Jericho, NY 1753)

Computer Associates is the leading independent factor in the mainframe systems software market. The company develops and markets a broad range of standardized systems as well as applications software products for IBM and IBM-compatible mainframe computers using the MVS, DOS, VM, and VSE operating systems. CAI's product line includes systems software, relational data base management systems, and applications software for use on mainframes, minicomputers, and microcomputers. Applications software is provided for such areas as financial management, visual information, banking, and project management.

The company currently offers more than 100 software products. CAI has also developed a number of strategic alliances with Apollo, Prime, Data General, HP, and DEC.

The company has over 8,500 mainframe and minicomputer product installations and has sold more than one million copies of its integrated accounting and productivity microcomputer software products.

CAI is organized into four divisions:

- The Systems Product Division
- The Applications Product Division, which markets and supports the company's financial applications, graphics, project planning, data base management systems, decision support, and programmer productivity software in North America.
- The Micro Products Division
- The Far East Products Division

Computer Associates' (calendar) revenues in 1987 increased 83% to \$605 million, and net income expanded by 130% to \$74 million. Revenues in 1987 included the results of the UCCEL acquisition.

The company's strong financial performance in 1987 reflects growth from acquisition, new products, and overall improvement in market share. In addition, the successful integration of products acquired through acquisition, such as spreadsheets, graphics, and financial packages, has been key to the success of the company in recent years.

Since 1982, CAI has made 15 acquisitions.

In September 1988, CAI announced its agreement to acquire Applied Data Research, Inc. (ADR) from Ameritech for \$170 million. ADR, which is a provider of systems software products to cross-industry markets, had revenues of approximately \$173 million in 1987.

c. Microsoft Corporation (16011 N.E. 36th Way, Box 97017, Redmond, WA 98073)

Microsoft develops and markets microcomputer systems and applications software for business and professional use. Its principal systems software products include Microsoft® MS-DOS® for IBM PC and IBM-compatible computers and the OS/2 operating system for the IBM PS/2 and compatible hardware platforms. Microsoft is also a leading factor in the Macintosh applications software market, and also provides applications for the UNIX operating systems environment.

In 1987, Microsoft's revenues increased by 75% to \$457 million, and net income improved by 61% to reach \$93 million.

Microsoft management attributes its recent revenue increases to the following:

- The introduction of new products and enhancements to existing products
- The expansion of the company's export sales and foreign operations
- The general expansion of the market for microcomputer software

Recent investments/acquisitions made by Microsoft include the following:

- In January 1987 Ashton-Tate joined the development effort of Microsoft Corp. and Sybase for an SQL Server data base engine. Ashton-Tate is building a version of its Dbase IV that will act as a front-end data base and use SQL Server as a back-end data base engine.
- In January 1987, Microsoft announced an alliance with Hewlett-Packard and Aldus Corporation to promote a Microsoft-windows-based solution for the desktop publishing market for machines running the MS-DOS operating system.
- In June 1987, Microsoft announced a minority equity investment and product licensing agreement with Natural Language Incorporated (NLI) of Berkeley, CA. NLI's first product, the NLI DataTalker, is an English-language interface that allows novice users to access data bases in plain English.

Microsoft also entered into an agreement with 3Com to co-develop and jointly market the Microsoft OS/2 LAN Manager.

d. Oracle Corporation (20 Davis Drive, Belmont, CA 94002)

Oracle provides software products used for data base management, applications development, decision support, and network communications, as well as related support and consulting services. Oracle's principal product is the ORACLE relational data base management system.

Oracle provides software products to many industries, including the aerospace, automotive, computer manufacturing, energy, education, engineering, finance, insurance, publishing, retail, telecommunications, and transportation industries, in addition to state, local, and federal governments.

Oracle's revenues increased by 126% to \$187 million in 1987, and net income expanded by 198% \$23 million.

Oracle's management attributes the major revenue expansion in recent years to the strong growth rate in the data base management systems markets, the company's very strong competitive position in the fast-growing international markets and to its continuing improvements in domestic market share in both the DEC minicomputer and IBM mainframe, and most recently IBM microcomputer markets for data base management product and application development tools.

Oracle's strategy is to provide software that integrates different computers, operating systems, networks, and data base management systems into a single computing and information resource.

In the fall of 1988, Oracle introduced a series of financial applications software packages and also announced the formation of professional services and systems integration units.

3. Processing Services

In 1987, INPUT separated its processing/network services vendor category into two groups: processing services and network services.

Processing services now includes transaction services and utility and other services, as well as systems operations (facilities management of vendor-owned systems).

Although the total revenues of the public processing services market in the INPUT index expanded at a 15% annual rate in 1987, companies addressing the financial services markets did particularly well. The growth rate in the market for third party processing services to the banking industry was particularly strong.

Profitability for the processing services group in 1987 was approximately 9%.

a. DST Systems, Inc. (1004 Baltimore Avenue, Kansas City, MO 64105)

DST Systems is a leading supplier of data processing services such as mutual fund shareholder accounting and recordkeeping to the mutual fund industry. In addition, the company also provides data processing services to such other financial services industry groups as brokerage firms, insurance companies, and banks.

DST Systems' revenues increased by 37% in 1987 to \$137 million, and net income expanded 50% to \$19.8 million.

The company's success is based in large part on its continuing ability to bring creative new product solutions to the financial industry, its ability to increase prices on a regular basis, its continued investment in new software and computer facilities, and the strong growth in mutual funds and other types of managed investment accounts.

DST provides four basic processing systems, all of which are available on either an on-line or real time basis.

The four systems include:

- The Mutual Fund System is a shareholder recordkeeping system used by money market funds, equity funds, fixed-income funds, limited partnerships and others.
- The Securities Transfer System provides recordkeeping of traded securities for banks that choose to process locally, but require computerized interface with New York agents.
- The Insurance Recordkeeping System provides a recordkeeping system for equity-based insurance policies such as flexible premium or variable annuities.
- The Portfolio Accounting System tracks the underlying investments in mutual funds or in equity-based insurance programs.

DST is also a partner with other financial services companies: Boston Financial Data Services (State Street Boston Corp., partner) (BFDS); Investors Fiduciary Trust Company (Kemper Financial Services, Inc., partner) (IFTC); and Vantage Computing Systems, Inc., (Monarch Capital Corporation, partner) (VCS).

In addition, its SRI wholly owned subsidiary offers a design, printing, and bulk mailing service for the financial industry. DST also has a 100% owned real estate subsidiary, DST Realty, Inc.

The primary markets for DST today are mutual funds, insurance companies, investment managers, banks and savings institutions, and brokerage firms.

b. First Financial Management Corporation (3 Corporate Square, Suite 700, Atlanta, GA 30329)

First Financial Management Corporation provides a range of third-party processing services for the handling of various financial transactions and for the management of customer accounts. The company's primary customers include banks, thrifts, mortgage servicers, and merchants. FFMC also provides data imaging services.

In 1987, First Financial Management Corporation's revenues increased 151% to \$175 million, and net income expanded 111% to \$11.7 million.

FFMC management attributes its recent growth in revenue and net income to the following:

- The majority of revenue growth is attributed to acquisitions. The revenue contribution from current-year acquisitions was \$74 million in 1987, \$10 million in 1986, and \$10 million in 1985.
- In addition, the market for third-party processing services for financial institutions has been in a strong growth phase, related in large part to the trend to outside vendors for such services by the banking and savings and loans industries.

Since 1984 FFMC has acquired 20 companies.

FFMC is currently organized into the following principal business units:

- The Financial Services Group includes the following three divisions:
 - The Bank Services Division provides processing services to over 1,300 bank customers in 25 states through 29 data centers.
 - The Thrift Services Division provides processing and associated services to approximately 170 thrift institutions in 24 states through data centers in Denver, San Diego, and Wichita.
 - The Mortgage Services Division provides mortgage processing services to 85 mortgage servicers in 23 states through its data center located in Atlanta (GA).

The Data Imaging Services Group provides data imaging services, including computer output micrographics and electronic printing, to over 3,500 customers through processing centers located in 15 states.

The Merchant Credit Card Services Group provides credit card authorization and financial clearing services to retailers.

c. Systematics, Inc. (4001 Rodney Parham Road, Little Rock, AR 72212)

Systematics, Inc., provides facilities management and disaster recovery processing services, applications software products, consulting professional services, and turnkey systems to the banking and finance industry.

Until 1981, Systematics operated as an unconsolidated, majority-owned (75%) subsidiary of Stephens Inc., an investment banking firm also located in Little Rock. Subsequent to public offerings of Systematic's common stock in fiscal 1982 and 1983, Stephens Inc. currently owns 48.7% of the outstanding shares of Systematics.

Currently, Systematics derives approximately 3.5% of its revenues from processing services provided to affiliates of Stephens.

Systematics' revenue increased 24% in 1987 to \$160 million, and net income rose 27% to \$13 million.

Management attributes much of the recent strength in company performance to the growth in Systematics' facilities management business. During the third quarter of fiscal 1988, the company signed eight new facilities management contracts with aggregate contract values in excess of \$75 million. This continues a strong sales trend that began over a year ago.

Approximately three-quarters of Systematics' 1987 revenues was derived from processing services (facilities management), 11% from applications software products, 2% from consulting professional services, and the remainder from equipment sales and leases.

d. Telecredit, Inc. (1901 Avenue of the Stars, Los Angeles, CA 90067)

Telecredit provides on-line payment services that facilitate the financial exchange between buyers and sellers at the point of sale.

Principal services include credit authorization, credit and debit card processing, and a computerized letter collection service.

Through Light Signatures, Inc. (LSI) Telecredit also provides computerized "signaturizing" of consumer products.

Telecredit's revenues increased 14% in 1987 to \$136 million, and net income rose by 62% to \$13.5 million.

Approximately 93% of Telecredit's revenues in 1987 was derived from payment processing services. The remaining 7% was derived from light signature services, interest, equipment rentals, patent licensing and gains on sales of assets.

Management attributes the strength of its financial performance to improvements in market share in the check services market, service enhancements, a continuation of a favorable growth trend in the check services market, and improvements in operating efficiencies.

Telecredit is principally engaged in providing payment services through a national on-line telecommunications network and computerized data bases. Authorization of check, credit card, and debit card transactions is available either by telephone, point-of-sale terminals, or electronic cash registers.

4. Network/Electronic Information Services

In separating processing and network services into two vendor categories in 1987, six public companies that were previously in INPUT's processing services delivery mode were transferred to the new network/electronic information services group.

Definitions of companies in the network services category include those providing value-added network services (VANS), electronic mail, electronic data interchange (EDI) as well as those companies providing electronic information services (data bases, news, and videotex).

In 1987, the revenues of the public network services companies increased at an average annual rate of 32% whereas net income improved by 45%.

With the exception of the more-commodity-oriented value-added network services, growth in the other major electronic delivery modes was strong across all the other major segments.

Telerate, the largest and most profitable of these companies, achieved a 22% profit margin in 1987. Profitability for the group was approximately 12%.

**a. CCX Network, Inc. (name recently changed to Acxiom Corp.)
(301 Industrial Blvd., Conway, AR 72032)**

CCX Network provides data processing services for the direct (targeted) marketing industry in the United States and the United Kingdom.

The company provides a full range of services to businesses which utilize direct marketing techniques such as mail order and catalog sales, prospect generation, and telemarketing.

CCX Network's revenues increased 101% in 1987 to \$48 million, and net income rose 73% to \$3.2 million.

In 1986, CCX Network formed service agreements with the United States Postal Service and Standard Rate & Data Service, Inc.

In 1987, types of service offerings were expanded through acquisitions, mergers, and a joint venture with an international advertising agency. As a result, the company's services now includes data base management, list processing, list enhancements, telemarketing, mail preparation, order fulfillment, and marketing analysis.

CCX's primary vehicle for providing its services is its network of terminals through which direct marketing customers receive authorized access to lists and data bases maintained by CCX.

Management indicates that its continuing strong growth rate in revenue relates to a strong growth rate overall among mail order sales companies and an expansion in the number of services it provides, from acquisitions to internal development.

**b. CUC International, Inc. (707 Summer St., P.O. box 10049,
Stamford, CT 06904-2049)**

CUC International, formerly Comp-U-Card International (name changed in 1987) provides electronic home catalog services accessed by personal computers or by telephone, an industry the company pioneered in the early 1970s.

Customers pay \$39 a year for access to its data base of over a quarter million name-brand products. A major benefit to the consumer is the potential for obtaining discounts on brand-name merchandise as high as 50%.

CUC International's revenues increased by 40% in 1987 to approximately \$199 million, and net income rose by 105% to \$17.4 million.

The company itself does not handle an inventory of products. Rather, its computers have access to a list containing the latest bids from several hundred distributors, wholesalers and retailers, and then lists the best price. CUC places the order to the lowest bidder, and the merchandise is then delivered to the customer's home.

As a result of acquisitions over the past several years in such vertical markets as insurance, travel services, legal services, and credit card protection, CUC International has now become a leading consumer membership services company with more than 10 million consumers. Through its Comp-U-Store On-Line electronic network, it provides customers access to a variety of home shopping services shopping, travel, insurance, and extended warranties.

In the fall of 1987, Comp-U-Store On-Line announced its plans to reposition its on-line shopping service to concentrate on discounted products.

Its PC-delivered services are available through six major information networks: CompuServe, Dow Jones News/Retrieval, The Source, Quantum, Genie and Delphi. A yearly membership is \$25. Presently, more than 60,000 PC owners shop from their home through Comp-U-Store's on-line service.

CUC's Comp-U-Card division also markets its services to credit card customers of the nation's largest financial institutions, major retailers, and oil companies. Its FISI Madison Financial Corporation, National Card Control, Inc. (NCC), and Benefit Consultants, Inc. (BCI) subsidiaries also provide services to checking accounts of banks and savings and loan associations and to members of credit unions.

Management attributes its continuing strong growth to an expansion in its services offerings, several new client agreements and particularly strong growth in its travel service segment.

c. Telerate, Inc. (One World Trade Center, New York, NY 10048)

Telerate, Inc., operates a worldwide computerized information systems (the Network) that provides real-time updated financial market data to securities firms, banks, corporations and other financial institutions primarily through approximately 70,000 video display screens at subscribers' premises throughout the world.

The Network provides video pages of prices, rates, market data and news covering major financial markets, including U.S. Treasury and federal agency securities, money market instruments, foreign exchange, U.S. mortgage market securities, precious metals, financial futures and energy, quotes for publicly traded equity securities, as well as financial news services, and market commentary and analysis. The Network also

offers services provided by third parties, including quotes for publicly traded equity securities from Quotron, Standard & Poor's Municipal Bond Service, and the Dow Jones and Bond Buyer newswires.

During 1987, Dow Jones & Company, Inc., increased its ownership in Telerate to 56% and, as a result, now includes Telerate's financial results in its accounts on a consolidated basis.

Telerate, Inc., generated approximately \$336 million in revenues in 1987, which was 45% above 1986 revenues. Net income was \$75 million, representing an 74% increase over 1986 results.

Telerate management attributes its revenue increases primarily to increases in the number of terminals worldwide as well as increased sales of optional services and equipment. To a lesser extent, revenue increases were attributed to the passage of increased communication tariffs in North America.

During 1987 Telerate entered into the following agreements:

- In October 1987, Telerate formed a partnership with American Telephone and Telegraph Company to develop and market electronic transaction services for global financial markets. This partnership will provide a system enabling traders to manage transactions instantaneously and with greater control and flexibility than is presently possible. The service, still under development, initially will be targeted to foreign exchange dealers.
- In June 1987, Telerate entered into an agreement with Lotus Development Corporation to produce software that will allow Lotus 1-2-3® users to access Telerate's real-time fixed income and foreign exchange information from within their spreadsheets. The product is scheduled for commercial availability during 1988.

Telerate's major competition comes from Reuters Limited.

5. Turnkey Systems

Turnkey systems solutions include an integration of systems software, packaged or customized applications software, a CPU, equipment and peripherals.

The public turnkey systems vendor revenues grew at an annual rate of 15% in 1987. This compares with annual growths of 7% and 10%, respectively, in 1985 and 1986. Earnings for the group fell 96% in 1985, jumped 376% in 1986, and grew 74% in 1987.

Turnkey systems are targeted at market segments that require a specific set of user requirements. In particular, this includes such markets as electronic publishing, manufacturing production planning, CAD/CAM/CAE, management information systems, government, telecommunications, architecture, engineering, and construction and service-oriented organizations such as hospitals and accounting firms.

There has been considerable inconsistency in the earnings of the publicly traded turnkey systems companies over the past few years.

- In 1986, losses were sustained by Auto-trol, Avant-Garde, Computer Consoles, Computervision, Daisy Systems, HBO, Interleaf and Libra Systems. In 1987, losses were suffered by Computrac, Daisy Systems, and Pena Systems.
- Profitability for the public turnkey systems group in 1987 was 6%.

a. Interleaf, Inc. (10 Canal Park, Cambridge, MA 02141)

Interleaf, Inc. designs, develops, and markets turnkey systems and software for computer-aided publishing (CAP) applications.

The company markets its software products separately or bundled with hardware as turnkey systems. Its turnkey systems are available in a network or standalone configurations.

Interleaf generated \$52.1 million in revenues in 1987, an increase of 62% over 1986. Net income was \$5.2 million, representing a substantial turnaround from the \$794,000 loss the company experienced in 1986. Interleaf turned profitable in the fourth quarter of calendar 1986, and has remained profitable ever since, after sustaining losses during its inception in 1981.

Management attributes its historical strong growth in revenues to the introduction of new products, enhancements to existing products, the expansion of the company's sales operations, and the increased market awareness and acceptance of computer-aided publishing and the company's products.

In 1987 Interleaf announced a series of new products that provide for the use of its electronic publishing software at every stage of the document production cycle in a corporation and on a full range of business computers, workstations, and mainframes.

Interleaf markets its products on a turnkey basis on several different hardware platforms, including: DEC VAXstation II, VAXStation 2000, all Apollo computer workstations, Sun Microsystems' Sun II and Sun III and IBM's RT PC, PC/XT/AT and PS/2 systems. The company also has

OEM and third-party marketing relationships with IBM, DEC, Eastman Kodak, Apollo, Siemens AG and Schlumberger.

b. Cerner Corporation (2800 Rockcreek Parkway, Suite 601, North Kansas City, MO 64117)

Cerner Corporation develops, markets, and supports turnkey systems to the health care industry for use in clinical departments. Clients include hospitals, health maintenance organizations (HMOs), and reference laboratories.

In 1987, Cerner's revenues reached \$33.6 million, a 94% increase over 1987. Net income rose to \$4 million, an increase of 76% over the previous year.

Its principal product is PathNet®, which is a family of five categories of information systems: Laboratory, Common Clinical, Management, Commercial, and Advanced Laboratory Information Systems. A second clinical product line addresses the needs of the respiratory therapy and pulmonary functions of hospitals.

Each of these categories address a different set of customer needs and can be combined as necessary for the customer's individual functional and budgetary requirements.

PathNet is based on DEC VAX or Texas Instruments minicomputers.

The company began commercial marketing of PathNet® in May 1984.

Cerner markets its systems through both direct sales and indirect channels.

The company's strong growth rate can be attributed to its increasing penetration of the existing market for its PathNet® product as well as to the development of new systems that address other needs of clinical departments and are based on its proprietary Healthcare Network Architecture (HNA).

6. Professional Services (Commercial)

Commercial professional services include management consulting activities related to information systems consulting, production of custom software, and education and training for commercial business, as well as systems operations (facilities management) of client-owned computers, where the vendor provides human resources to operate and manage the client facilities.

In 1987, Advanced Systems was removed from INPUT's list of professional services vendors due to its merger with Applied Learning. Scientific Systems Services was removed due to its acquisition by Computer Task Group.

The commercial professional services segment has grown considerably faster than the government professional services segment during the past five years, although growth has begun to slow somewhat. Growth rates for the years 1985, 1986, and 1987 were 25%, 20%, and 22%.

Earnings for the commercial professional services segment increased 303% for the year 1987, although the segment experienced an 80% drop in earnings during the fourth quarter.

Profitability for the commercial professional services segment was 2% for 1987. Teknowledge's \$11.7 million loss adversely affected the already low margins secured by the group. Profitability is expected to increase for both the commercial and the government professional services segments.

a. AGS Computers, Inc. (1139 Spruce Drive, Mountainside, NJ 07092)

AGS Computers provides custom software development, professional services, systems integration and systems and applications software products primarily for the telecommunications, banking and finance, and computer manufacturing industries. AGS also distributes microcomputer-related software and hardware to resellers.

AGS Computer's revenues reached \$496.7 million in 1987, an increase of 30% over 1986. Net income rose to \$14.2 million, a 62% increase over the previous year.

Management attributes the company's recent continuation of its strong growth pattern to the growing acceptance by major banks of its security processing and trading software products.

In 1987, AGS Computers acquired Computer Consultants, Inc. (CCI), a Troy, MI-based systems development company. CCI provides a variety of information systems development services to a diversified group of companies in the Detroit area.

In mid-1988, AGS Computers sold its software products and services business to Nynex Corp. for about \$275 million. This reflects a major new emphasis on the systems integration market by Nynex.

AGS is also spinning off its MicroAmerica Inc. subsidiary.

b. Analysts International Corporation (7615 Metro Boulevard, Minneapolis, MN 55435)

Analysts International Corporation (AIC) provides professional services, including contract programming and related software services to a wide variety of industries. It is also a value-added remarketer of IBM mini-computers.

Analysts International's revenues grew at an annual rate of 29% in 1987, reaching \$64 million. Net income increased 380% to \$3.1 million. In 1986, the company reported a net loss of \$1.1 million.

Approximately 95% of revenues in 1987 was derived from professional services and the remaining 5% from its software products and hardware sales.

Professional services are provided in such functional areas as:

- Generation of functional and detailed design specifications
- Systems software design and development
- Programming, implementation, maintenance, testing and documentation
- Systems orientation and training seminars

In terms of industry segments addressed, approximately 28% of revenues in 1987 were from the manufacturing sector, 18% from telecommunications, and 17% from the electronics group.

Management attributed much of its 1987 revenue growth primarily to a major multiyear contract with a Fortune 100 company, which was awarded in the fall of 1986.

Computer Task Group owns 20% of the outstanding stock of AIC.

7. Professional Services (Government)

Government professional services include management consulting activities related to EDP systems consulting, production of custom software, and education and training for government as well as systems operations (facilities management) of government-owned computers, where the vendor provides human resources to operate and manage the government facility.

Rand Information Systems was removed from INPUT's list of professional services vendors, since the company has filed for bankruptcy.

The public sector of the government professional services group experienced a revenue growth rate of 13% in 1987; net income for these vendors grew at a 4% average rate.

Growth in net income for this group varied considerably, with eight of the twelve companies experiencing growth rates of 34% or higher. The average was negatively impacted by declines in net income growth experienced by Bolt Beranek and Newman (BBN), Logicon, and Softech.

Revenue growth for this segment has been below all other information services segments; however, the growth has been relatively stable for the last few years.

The profit margin for the government professional services segment in 1987 was 3%, with Bolt Beranek and Newman's results, in particular, having the most negative impact on the group.

a. American Management Systems, Inc. (1777 North Kent Street, Arlington VA, 22209)

American Management Systems, Inc. (AMS) provides professional services, applications software, and processing and micrographic services. Since 1982, AMS's marketing has focused primarily on larger financial services firms, federal government agencies, state and local governments, colleges and universities, energy industry clients, and telecommunications companies.

American Management Systems generated \$174.3 million in revenues in 1987, which was 29% above 1986 revenues. Net income rose 45%, from \$5.2 million in 1986 to nearly \$7.6 million in 1987.

Revenue growth occurred in all of AMS's target markets and was exceptionally strong with energy clients, telecommunications firms, and federal government agencies.

The higher growth rate in net income compared to revenue growth was due in part to reduced income tax expenses in 1987.

The company's strategy is to provide a combination of professional services, AMS productivity tools, and packaged proprietary applications software to clients in certain target markets and to maintain long-term relationships with its clients.

Recent acquisitions made by AMS include the following:

- In February 1988, AMS acquired Loecus Informatics, Inc., an Ottawa-based provider of various professional services, including strategic systems planning, information center management and organization, systems engineering, information systems research, and computer systems training.

- In February 1988, AMS was selected as a participant in IBM's Industry Marketing Assistance Program (IMAP). AMS will assist in the marketing and installation of IBM's DB2, SQL, and CSP products.
- In November 1987, AMS acquired Technica of Princeton (NJ). Technica provides credit decision models used by consumer credit grantors to make credit decisions.

b. Telos Corporation (3420 Ocean Park Boulevard, Santa Monica, CA 90405)

Telos Corporation specializes in providing professional services, including the design of military and aerospace real-time systems, custom applications software development, contract programming, and custom turnkey systems. The company also offers third-party maintenance service.

The company concentrates largely on Department of Defense and NASA programs, with approximately 87% of current contracts funded directly or indirectly by the federal government.

The company's Defense Systems division provides computer software design and development and support services, primarily for United States defense programs.

Telos Corporation's revenues increased 20% to \$92.4 million in 1987. Net income rose 69% to \$43.8 million.

Consulting Services provided approximately 32% of Telos's revenues in 1987.

In 1987 the company expanded its hardware services capabilities, with the acquisition of DMA, Inc., to include depot repair and resale of computer and peripheral equipment, as well as repair of telephone digital switch equipment and power supplies.

In 1987, a new software services business unit, Information Systems, was formed to provide office automation services primarily for civilian federal agencies.

8. Systems Integration

Systems integration was first identified by INPUT as a distinct delivery mode apart from professional services in its 1987 breakout of the information services markets. This reflects not only the strong interest in this area, as typified by several recent announcements of systems integration divisions by a number of large information services vendors, but also the increasing recognition of the potential for products that can provide integrated, multivendor solutions.

Systems integration involves the providing of a total information services solution, with principal submodes including equipment, packaged software, customized software, and professional services (as provided under a systems integration umbrella).

At present, there are very few relatively "pure players" in systems integration that are publicly traded. As such, INPUT has not established a separate index for publicly traded systems integration companies. Two of the larger independent, publicly traded companies with the majority of their revenues in systems integration are SHL Systemhouse and C3, Inc.

a. SHL Systemhouse Inc. (50 O'Connor Street, Ottawa, Ontario, Canada K1P 6L2)

Systemhouse provides integrated information systems for commercial and government customers. An estimated 60% of its 1987 revenues is from the U.S. market. Canada accounted for 35% of revenues and international revenues were 5%. While Canadian and international revenues were up 32%, U.S. revenues increased by 104% over 1986.

Of the total company revenue, an estimated 50% is in the area of professional services and the remainder is divided between hardware and systems and applications software, with a higher proportion in hardware.

The company's principal emphasis is federal government systems integration. INPUT estimates that approximately 80% of Systemhouse's federal government systems integration business is with the U.S. Federal Government.

Systemhouse's backlog entering 1988 was \$240 million. Pretax income for FY 1987 was 13.6% of total revenues for 1987, up from 9.6% in FY 1986. Total employment at fiscal year-end 1987 was 1,403, up from 1,000 a year earlier. With the average number of employees for 1987 being 1,164, revenue per employee for the year was \$151,000, up from \$139,000 in FY 1986.

A shortfall in earnings in FY 1988 related to a hold on U.S. government systems integration procurements and to operating problems in its U.S. subsidiary in Alexandria, VA. Both of these problems are viewed as temporary.

In mid-1986, Systemhouse signed a value-added reseller agreement with IBM Canada Ltd., which permits SHL Systemhouse to provide IBM hardware in systems integration projects along with that of other computer manufacturers.

Part of the company's growth in FY 1987 came from acquisitions. In 1986 SHL Systemhouse acquired Capital System, Inc. (CSI) of Alexan-

dria, VA. CSI, at the time of the acquisition in mid-1985, had established a five-year history of providing systems integration solutions to such U.S. Federal Government branches as the Army, Navy, Air Force, Treasury Dept., and the Secret Service. Subsequent to the merger, the Systemhouse Washington Branch was merged with the Alexandria offices of CSI to form the Capital Systems Branch of Systemhouse.

In 1987, the company acquired DDC Consultants of Edmonton and DPLA of Montreal, which increased the company's marketing presence in the provinces of Alberta and Quebec; ICT of Burlington, MA, which brought the company a core of expertise in optical disk and image processing technology; and Yipkon Corporation of Fairfield, NJ, which strengthened Systemhouse's marketing presence in various U.S. federal government accounts.

In June 1988, SHL Systemhouse purchased Rand Information Systems' software conversion business, including approximately 17 staff members and its license to conversion software tools and methodology.

b. Arthur Andersen & Company (69 West Washington St., Chicago, IL 60602)

Arthur Andersen & Co. is one of the most-rapidly growing companies in the management consulting professional services and systems integration markets. INPUT estimates that Arthur Andersen generated \$315 million in the U.S. in systems integration revenues in calendar 1987 and \$451 million in professional services revenues. Its revenues in these areas are growing at an estimated annual rate of 25% to 30%.

Industry market emphasis for AA & Co. in the U.S. is as follows: manufacturing, telecommunications, financial services, state and local government, and the federal government. Recently, the company has been taking steps to strengthen, in particular, its federal government market position.

Arthur Andersen's consulting division has its own separate organization from its audit and tax structure, which is unique in its industry. Each AA & Co. office has a managing partner in charge of management information consulting (MIC). This significantly reduces any potential for an audit/tax and management information consulting conflict of interest as well as increases the size of the source pool available for MIC projects.

AA & Co. operates five Advanced Systems Centers, which are large IBM computer facilities staffed with technical experts and project managers. Associated with the Advanced Systems Centers are Advanced Technology Centers. These Technology centers act as sites for AA & Co. R & D and training and client systems integration projects and education. Additional technology centers are planned for the capital markets, insurance, and health care industries.

Key software products sold by AA & Co. include: MAC-PAC, DCS, and FOUNDATION. MAC-PAC software products provide manufacturing systems on IBM System/370 and System/38 computers. MAC-PAC/JIT supports real-time communication with a CIM network. MAC-PAC has been particularly targeted for installation at defense contractors. It also supports both materials requirements planning and just-in-time techniques in an integrated environment.

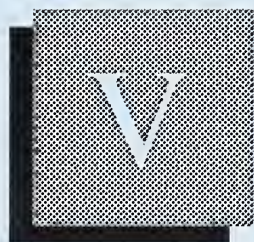
DCS (Distribution Control System) provides comprehensive coverage of the distribution business cycle: order entry, billing, inventory control, warehouse management, outbound logistics, distribution requirements, planning, purchasing, accounts receivable, and marketing information.

FOUNDATION is an integrated, automated software development environment designed to support the entire life cycle of applications software development.

A major strategic thrust of the company is to be a leader in commercial systems integration.

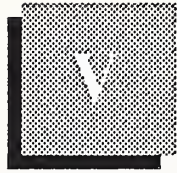
Several service lines of the company complement its systems integration thrust. These lines include strategic services and educational consulting, in particular.

Within the past two years, AA & Co. has established itself as one of the leaders in CIM and manufacturing systems integration. Its capability in this area has been demonstrated in its IMPACT exhibit, which is a fully integrated minifactory. It includes over \$18 million of hardware and software from IBM, Allen-Bradley, INTEL, Intergraph, and many others. It is now permanently housed in the AA & Co. Systems Integration Center on the campus of Northwestern University, Evanston, IL.



Processing Services Sector Analysis





Processing Services Sector Analysis

A

Processing Services Market, 1987

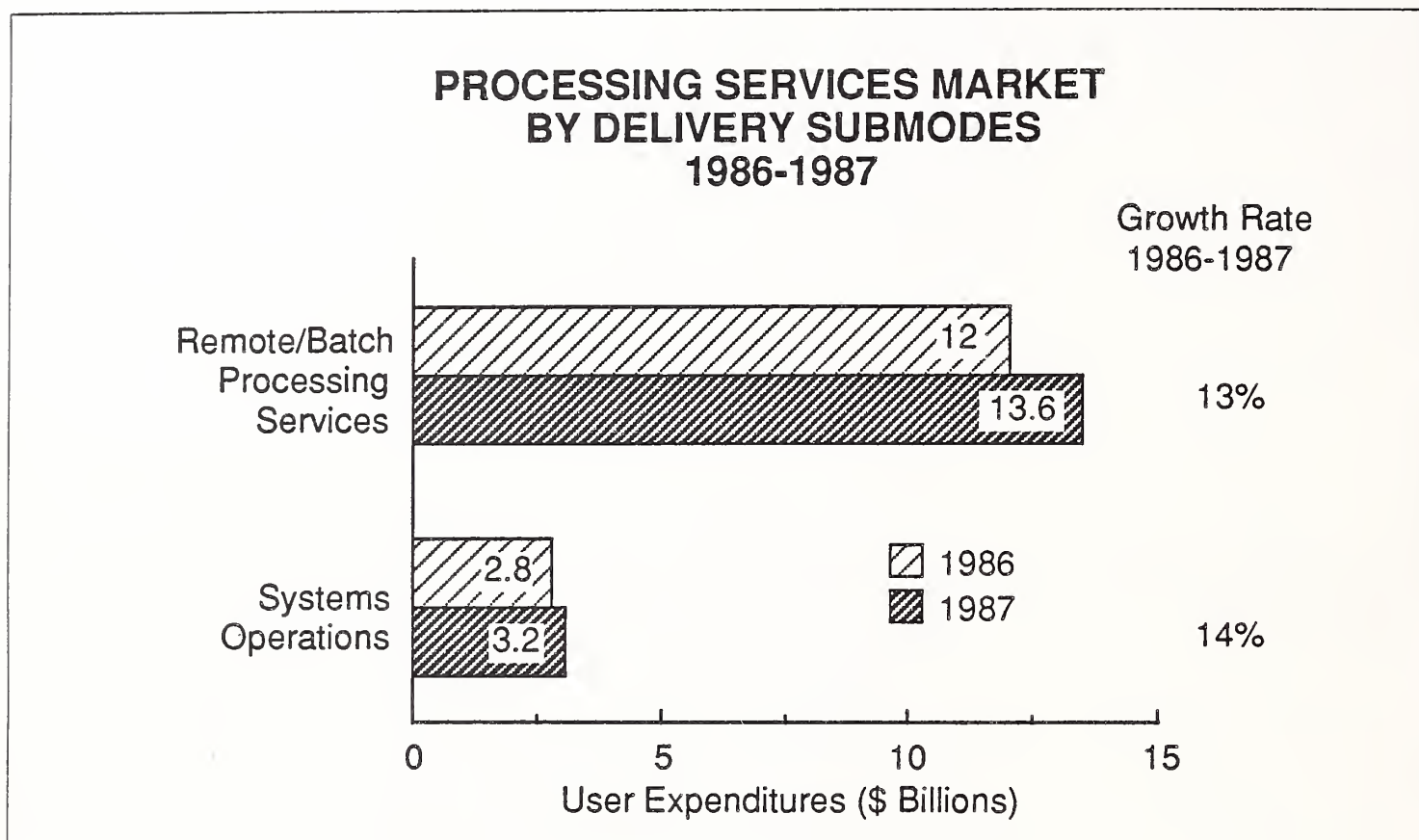
Prior to 1987, INPUT recorded processing services markets in combination with network services. Processing services defined as a separate delivery mode has two submodes: remote/batch processing services, which includes transaction services, utility services, and other services; and systems operations, which is facilities management of vendor-owned systems. Network services/electronic information services includes value-added network services (VANS), electronic mail, electronic data interchange (EDI), and electronic information services (EIS), which represents on-line delivery of data bases, news, and videotex.

Market size information on industry sectors within the processing services market is provided in a series of separate reports classified by the two-digit major groups of the standard industrial classification (SIC) codes of the federal government.

Total processing revenues from all types of companies was \$17.0 billion in 1987 compared to \$14.9 billion in 1986. This represents a 25% share of the information services industry.

The growth rate for the total processing services market in 1987 was 14%, from \$14.8 billion in 1986 to \$16.8 billion in 1987. Within the total processing services market, the remote/batch processing services submode—defined as transaction processing, utility services, and other services—grew from approximately \$12 billion in 1986 to \$13.6 billion in 1987, reflecting an annual growth rate of 13%. The systems operations submode (facilities management of vendor-owned systems), as shown in Exhibit V-1, expanded from approximately \$2.8 billion in 1986 to \$3.2 billion in 1987, reflecting an annual growth rate of 14%.

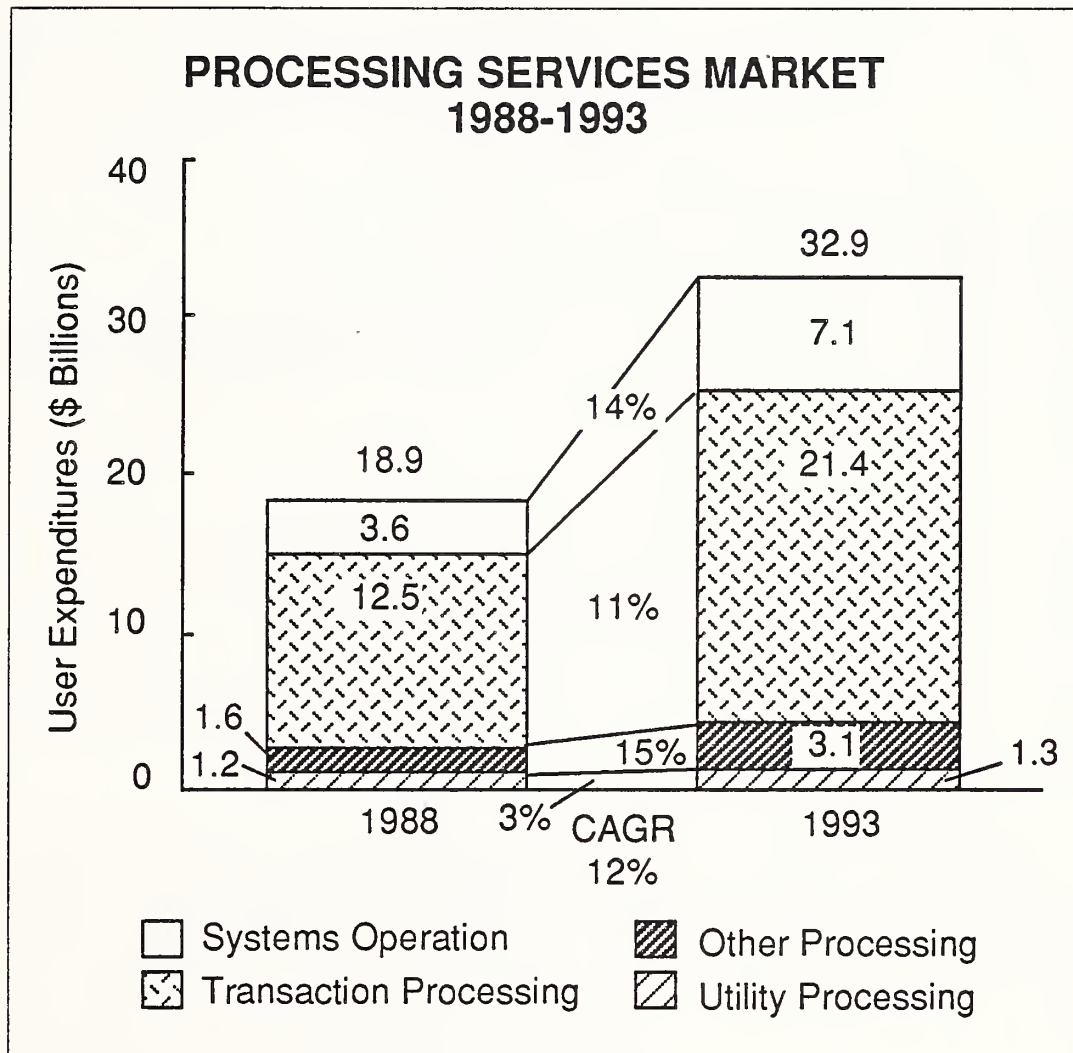
EXHIBIT V-1

**Forecast:**

As Illustrated in Exhibit V-2, INPUT forecasts that the total market for processing services will increase from \$18.9 billion in 1988 to \$32.9 billion in 1993, for an CAGR of 12%. The growth rates from 1988 through 1993, as outlined below, reflect INPUT's projection of a continuation of a very gradual slowing of the annual growth rate for the processing services market over the next five years.

87	14%
88	12%
89	12%
90	12%
91	11%
92	11%

EXHIBIT V-2



Driving forces that continue to positively impact growth in the total processing services market, shown in Exhibit V-3, include the following:

- **Current User Inertia to Change:** This reflects the fact that it is usually easier to continue using processing services than to develop an alternative in-house computer installation.
- **Outsourcing Trends:** To control costs or to obtain expertise not available in-house, there has been a trend in the past few years, particularly in certain industries such as the banking and other financial services areas, to buy outside services. The death of the processing services industries has been predicted for years, but the most recent outsourcing trends has been a strong countervailing force.
- **Disaster Recovery:** With the increasing recognition of the mission-critical status of many corporation data processing installations, there is

increasing interest in disaster recovery capability. The fire at the First Interstate Bank computer center in Los Angeles, in particular, drew attention to this issue. Companies such as Comdisco and Sungard are offering this service and more companies are viewing it as a necessity.

EXHIBIT V-3

**PROCESSING SERVICES MARKET—
DRIVING FORCES**

- Current User Inertia to Change
- Outsourcing Trends
- Disaster Recovery

Inhibiting forces that will continue to negatively impact growth in the total processing services, shown in Exhibit V-4, include:

- **Micro/Mini Solutions:** In many cases micro- and mini-based computer solutions are more advantageously priced than the larger processor-based processing services. In addition, some very elegant software is being written for the smaller boxes.
- **Price/Performance of Processing Services:** The large processing services are still more expensive to run, and there is the additional telecommunication cost.
- **Entry Costs:** It is expensive to get into the processing services business, which is discouraging new market entrants. An exception is companies such as Bechtel Corporation, which is entering this market to take advantage of its large installed computer base.
- **Market Maturity:** Processing services is a 20-year-old market. Most corporations that would like to use this delivery mode are already doing so. As such, it represents a slow-growth market environment.

EXHIBIT V-4

**PROCESSING SERVICES MARKET—
INHIBITING FORCES**

- Micro/Mini Solutions
- Price/Performance Processing Services Disadvantage
- Entry Costs
- Market Maturity

B**Processing Services
Market Competitive
Analysis**

See Exhibit V-5 for market share information on the total processing services market, including both private and public vendors. The data represent only the processing services revenues for each company. The revenue figures reflect INPUT's estimates where specific information is not available from the vendor.

Section D of this chapter provides market share rankings on publicly owned companies (pure players) providing processing services.

EXHIBIT V-5

MAJOR VENDORS' SHARES OF PROCESSING SERVICES MARKET - 1987

Company Name	1987 Revenue (\$ Millions)	Market Share (Percent)
Automatic Data Processing, Inc.	1,041	6
EDS Corporation	635	4
Control Data Corp.	437	3
First Data Resources, Inc.	320	2
Shared Medical Systems Corp.	274	2
McDonnell Douglas Infor- mation Systems Group	252	2
CSC Corporation	208	1
MTech	186	1
First Financial Management Corp.	175	1
National Data Corporation	153	1
GE Information Services Co.	152	1

C

Processing Services Market and Trends

Processing services are third-party Remote Computing Services (RCS), provided either on-line or batch. Submodes include transaction services, which usually address specific industry groups with industry-specific applications software; utility services, which provide access to basic software tools enabling the users to develop their own problem solutions

(language compilers, assemblers, DBMS, sorts, scientific library routines, etc), akin to the traditional service bureau (timesharing) business; other services, which include carry-in batch processing, computer output microfilm services (COM), data entry services and disaster recovery/backup services; and systems operations, where a vendor provides a complete operating information systems for a customer, including equipment, software, personnel, and facilities.

The market for batch processing, which has been declining over the past decade, has begun to stabilize.

There are several strong growth sectors within the on-line transaction processing services submode. Particular strength has been exhibited in the following vertical markets:

- Automated bank processing services for small- to medium-sized banks, savings and loans, and other financial institutions; leading independent vendors in this area include First Financial Management, FIServ, Inc., Systematics, ADP (automated teller machines, EFT, back-office brokerage services), Concord Computer (bank credit card authorization), and Telecredit (electronic payment authorization services)
- Services for the insurance industry, including on-line collision estimating and claims adjustment (ADP Collision), and policy processing (ISI Systems)
- Information management services for the health care industry (Cycare)

Strength in the financial services market sectors relates in part to the increasing use of electronic data processing as a competitive tool in pricing services and reducing the cost of product delivery, particularly by the larger institutions. This situation has required the smaller- to medium-sized institutions to provide comparable services to remain competitive. With the recent deregulation in many of the financial services sectors, margins have been squeezed, and the use of third-party data processing services has increased to reduce internal overhead costs. This trend is expected to continue.

Keys to success in these areas relate to economies of scale of operation and lower unit costs as well as a reputation for providing high-quality service.

Future opportunities exist in the areas of intersystem networking processing and through generally increasing breadth of products and services particularly in the larger vertical markets, including more real-time service delivery on personal computers.

A more recent on-line processing service is that of electronic vaulting, where data is sent on an on-line, real-time basis to an electronic vault for disaster backup storage.

At the low end of the processing services market, smaller VARs are perceiving a new market opportunity in providing a service bureau type of offering to smaller government and other public institutions.

D

Public Processing Services Company Revenue and Net Income Performance

In 1987 INPUT separated the processing/network services delivery mode into two separate categories (processing services and electronic information services). As such, the following companies with an average growth rate in 1986 of 31% were transferred in 1987 to the new delivery mode category of electronic information services companies: CCX Network, Epsilon, Info Resources, LCS Industries, and Telerate. Since the average annual growth rate in 1986 for the combined category of processing/network services was 19%, the transfer of the network services companies to a separate category had a dampening impact on the growth rate of the processing services group in 1987, when comparisons are made in INPUT's 1986 annual Information Services Report. However, without these five companies included, the public processing service companies tracked by INPUT in 1986 showed an average revenue growth rate of 16%.

In addition, Anacomp was removed from the 1987 list of public processing services vendors due to its acquisition of DatagraphiX, which changed its primary business. First Data Management was also removed due to its acquisition by First Financial Management. In addition, Flserv and ISI Systems were added to the list.

At 1987 year-end, the public processing services sector demonstrated a 15% average annual growth rate. On a last three rolling, three-quarter basis in 1986, the growth rate was 16%. These figures reflect a continuing relatively steady growth pattern in revenues for this group.

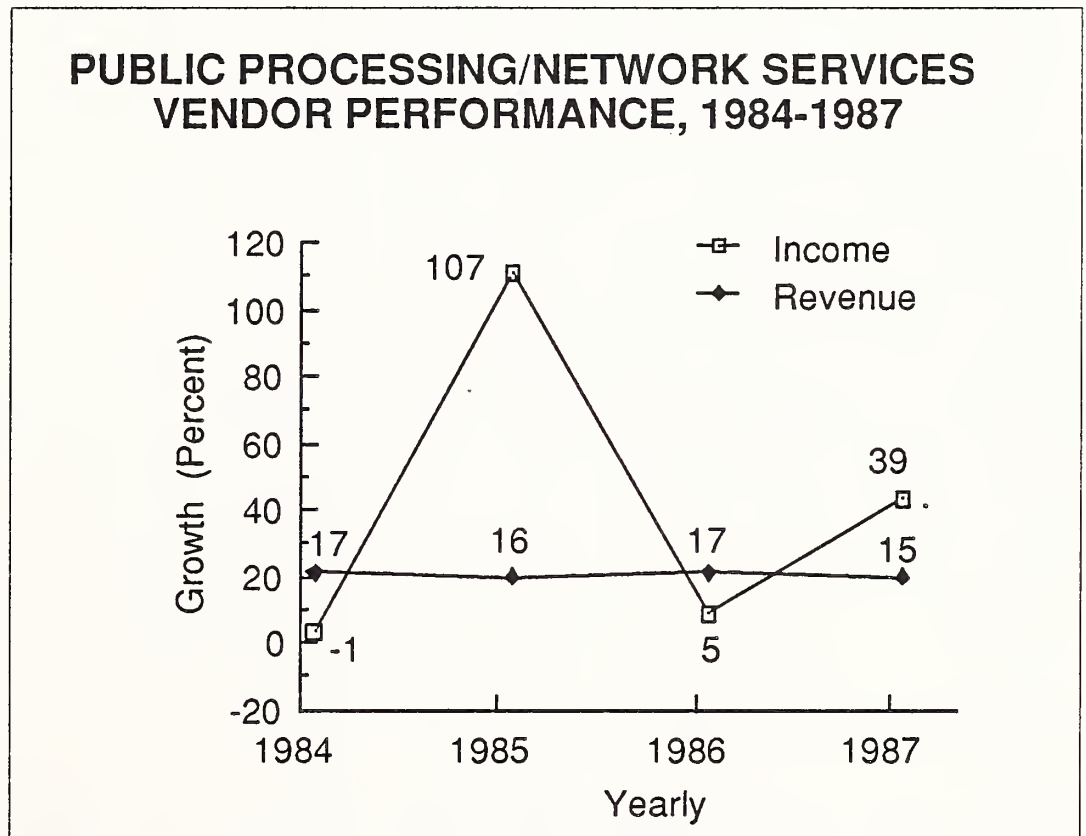
The average net income for the public processing services group (excluding the electronic information services vendors), showed a modest increase of 5% in 1986. In 1987, however, the net income of the public

processing network services companies expanded at a 39% average annual rate. These figures reflect a continuing pattern of sporadic earnings in this group, which stems in part from continuing shifts in technology and "hot" vertical markets.

Profitability for the processing services group in 1987 was approximately 9%.

For a historical perspective on the revenue and net income performance of the public processing services vendors, see Exhibit V-6.

EXHIBIT V-6



See Exhibits V-7 and V-8 for summary information on the independent public processing firms (pure players) tracked in INPUT's Vendor Financial Watch Index.

For more specific information on some of the more successful public processing services companies and their products, markets and strategies, see Chapter IV of this report.

EXHIBIT V-7

REVENUES OF PUBLIC PROCESSING NETWORK SERVICES COMPANIES

COMPANY NAME	FISCAL YEAR END	REVENUE (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986 %(+/-)	LAST 3 ROLLING QUARTRS	LAST 2 ROLLING QUARTRS
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL			
ADP	06-30	324259	318571	321110	334162	1298102	373700	355274	361305	376697	1466976	13	12	13
CITIZENS FIN.	09-30	2773	2662	2731	2917	11083	2992	2841	2693	2768	11294	2	0	-3
COMDATA NTWK	12-31	22149	21668	21752	20984	86553	25180	25899	25534	23998	100611	16	17	16
COMNET	03-31	10469	9165	10170	10188	39992	11231	10188	11212	11331	43962	10	11	11
COMP-U-CHECK	11-30	1908	1683	1658	2048	7297	2060	1947	1974	1694	7675	5	4	-1
COMPUTER LAN.	12-31	33498	20700	18288	20919	93405	33352 ¹	20900	19611	28274	102137	9	15	22
COMPUTER RES.	08-31	2559	2306	2345	2335	9545	2530	2454	2159	2341	9484	-1	0	-4
COMPUTER SVCS	02-28	3006	2813	3034	2926	11779	3279	3026	3185	3160	12650	7	7	6
CONCORD COMP.	09-30	2974	3336	3664	4417	14391	4373	4689	5308	5763	20133	40	38	37
CYCARE	12-31	12800	14695	14347	15344	57186	14928	16897	17160	18733	67718	18	19	21
DST SYSTEMS	12-31	22868	24716	25715	26901	100200	31889	35563	35594	34416	137462	37	37	33
DYATRON	12-31	7719	7710	8389	9285	33103	8291	8923	9721	9683	36618	11	12	10
FDP	11-30	3367	3866	3087	3149	13469	2983	4058	3958	3214	16213	6	11	15
FIRST FIN. MGT	12-31	14463	15158	15469	24604 ²	69694	26502	27377	29378	91854	175111 ³	151	169	203
FISERV	12-31	13722	17620	19099	19929	70370	20512	21370	21028	22621	85531	22	15	12
GTECH	02-25	26883	17900	26293	60374 ⁴	131450	26881	25011	34845	40606	127343	-3	-4	-13
HALE SYSTEMS	03-31	1375	1102	1127	786	4390	1079	1067	1188	1031	4365	-1	9	16
ISI SYSTEMS	06-30	6323	7118	7107	7570	28118	8213	8782	8451	9001	34447	23	20	19
KEYDATA	07-31	950	1049	683	646	3328	533	479	411	400	1823	-45	-46	-39
M/A/R/C	03-31	12995	12183	13447	15800	54425	12679	14639	13561	15018	55897	3	4	-2
NATL DATA	05-31	39056	37790	37607	39263	153716	39963	41983	43400	42542	167888	9	12	12
NATL FSI	12-31	3630	4402	3639	3772	15443	4089	3807	3394	5986	17276	12	12	27
PAYCHEX	05-31	13131	13766	14958	15328	57183	16594	17011	18004	19248	70857	24	23	23
PAY-FONE	06-30	1581	1707	1746	1998	7032	1568	1406	1529	1494	5997	-15	-19	-19
SCICOM DATA	06-30	3268	3687	3356	3890	14201	3279	3958	3753	4571	15561	10	12	15
SCS/COMPUTE	04-30	11157	1283	1425	1930	15795	13380 ⁵	1496	1735	6261	22872 ⁶	45	105	138
SEI	12-31	28683	30353	27571	31933	118540	29947	30384	29853	32557	122741	4	3	5
SHARED MEDICAL	12-31	87281	92494	96418	98687	374880	96630	95945	99072	99083	390730	4	2	2
SYSTEMATICS	05-31	31627	31830	31348	34184	128989	37753	38292	40382	43867	160294	24	26	29
TELECREDIT	04-30	26567	27765	29945	35070	119347	32096	32144	30130	42060	136430	14	12	11
TOTAL SYS. SVC	12-31	8367	8964	9060	9962	36353	9729	10826	11957	13773	46285	27	31	35
TSR	05-31	4794	5299	6037	6351	22481	5852	6134	6258	6148	24392	9	5	0
WORLCO DATA	03-31	1788	2326	2658	2717	9489	3191	2695	2750	2839	11475	21	8	4
TOTALS		787990	767687	785283	870369	3211329	907258	877465	900493	1023032	3708248	15	16	16

* INPUT ESTIMATE

EXHIBIT V-8

NET INCOME OF PUBLIC PROCESSING NETWORK SERVICES COMPANIES

COMPANY NAME	FISCAL YEAR END	NET AFTER TAX INCOME (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/	LAST 3	LAST 2
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	1986 %(+/-)	ROLLING QUARTRS	ROLLING QUARTRS
ADP	06-30	31860	30960	22690	30010	115520	39300	40050	30370	40120	149840	30	32	34
CITIZENS FIN.	09-30	312	307	310	339	1268	421	306	307	340	1374	8	0	0
COMDATA NTWK	12-31	3819	2080	3040	3264	12203	3954	3309	-385	-5638	1240	-90	-132	-196
COMNET	03-31	517	136	251	303	1207	1942 ⁷	402	453	519	3316	175	99	75
COMP-U-CHECK	11-30	122	164	108	112	506	141	81	-62	-1243	-1083	-314	-419	-693
COMPUTER LAN.	12-31	5097	-1334	-513	-3035	215	4344	-2437 ⁸	-2929	-507	-1529	-811	-20	3
COMPUTER RES.	08-31	153	92	-15	82	312	218	88	-78	104	332	6	-28	-61
COMPUTER SVCS	02-28	335	190	276	281	1082	329	232	244	329	1134	5	8	3
CONCORD COMP.	09-30	2	4	22	177	205	178	335	380	635	1528	645	565	410
CYCARE	12-31	715	789	697	665	2866	1693	949	1019	101	3762	31	-4	-18
DST SYSTEMS	12-31	1840	2709	3148	5492 ⁹	13189	4298	5064	5306	5122	19790	50	37	21
DIATRON	12-31	191	26 ¹⁰	246	1456	1919	515	628	923	1483	3549	85	76	41
FDP	11-30	114	84	-22	133	309	-172	139	261	58	286	-7	135	187
FIRST FIN. MGT	12-31	1033	1428	1443	1619	5523	1919	2265	3021	4438	11643	111	117	144
FISERV	12-31	896	2356	1096	1132	5480	1674	1732	1808	1960	7174	31	20	69
GTECH	02-25	-554 ¹¹	-839	174	7566 ¹²	6347	786	941	1448	2509	5684	-10	-29	-49
HALE SYSTEMS	03-31	-4504 ¹³	-205	-180	-498	-5387	270	-91	-53	-178	-52	99	64	66
ISI SYSTEMS	06-30	307	2586	573	657	4123	1121	1201	1213	1263	4798	16	-4	101
KEYDATA	07-31	-85	49	-285	-183	-504	-204	-309	-48	-100	-661	-31	-9	68
M/A/R/C	03-31	610	427	325	597	1959	779	648	661	854	2942	50	60	64
NATL DATA	05-31	2971	-1388 ¹⁴	3113	3406	8102	3516	3530	3722	3911	14679	81	118	17
NATL FSI	12-31	-281	27	30	-166	-390	89	-179	-1349	198	-1241	-218	-1120	-746
PAYCHEX	05-31	875	1319	1472	959	4625	1109	1354	1797	2053	6313	36	39	58
PAY-FONE	06-30	80	104	198	328	710	-79	-504 ¹⁵	73	-49	-559	-179	-176	-95
SCICOM DATA	06-30	-270 ¹⁶	142	194	277	343	190	270	250	378	1088	217	46	33
SCS/COMPUTE	04-30	4344	-857	-874	-890	1723	4278	-1173 ¹⁷	-1156	-110	1839	7	7	28
SEI	12-31	1236	916	-10189 ¹⁸	940	-7097	1701	2206	2663	2855	9425	233	193	160
SHARED MEDICAL	12-31	11531	-7350 ¹⁹	13533	14254	31968	12847	10665	10858	10948	45318	42	59	-22
SYSTEMATICS	05-31	2981	3019	1765	2490	10255	3588	2319	2895	4199	13001	27	29	67
TELECREDIT	04-30	1413	1414	2067	3454	8348	2563	2826	3196	4939	13524	62	58	47
TOTAL SYS. SVC	12-31	1041	1173	1297	1727	5238	1356	1544	1855	2438	7193	37	39	42
TSR	05-31	107	37	186	206	536	161	106	168	180	615	15	6	-11
WORLCO DATA	03-31	357	57	103	152	669	18	-389 ²⁰	-379 ²¹	-167	-917	-237	-400	-314
TOTALS		69165	40622	46279	77306	233372	94843	78108	68452	83942	325345	39	40	23

* INPUT ESTIMATE

33 COMPANIES

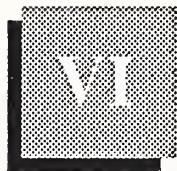
Processing Network Services Footnotes

1. Computer Language's seasonal results are skewed by income tax business.
2. First Financial Management's increase in revenue reflected acquisitions of American Information Services, American Data Technology, and Mid-Continent Computer Services.
3. First Financial Management's results included the acquisition of First Data Management.
4. GTECH's improvement in operating results was attributed to the sale of a major lottery network to the state of California.
5. SCS/Compute generates most of its revenue and all of its profits during the fourth quarter of its fiscal year.
6. SCS/Compute's results included the acquisition of Accountants Microsystems Inc. (AMI).
7. COMNET's net income included a tax benefit of \$331,000, resulting from tax loss carryforwards.
8. See footnote 1.
9. DST Systems' income included a pretax gain of approximately \$3.7 million from the sale of partnership interests.
10. Dyatron's net income results for the past two quarters were attributed to internal training costs for new IBM System/36 software.
11. GTECH's loss included a \$1.2 million write-off of its investment in Videoway.
12. See footnote 4.
13. Hale Systems' losses for fiscal 1986 included a write-down of computer equipment and related software products, as well as a nonrecurring charge associated with a litigation involving one of its subsidiaries.
14. National Data's net loss included a write-off of its discontinued Rapidata time-sharing operation.
15. Pay-Fone's loss included the following nonrecurring expenses: litigation settlements paid to franchises, including related legal expenses; termination of an employment contract and related expenses paid to a former president; and special proxy contest costs.

16. Scicom Data's loss involved a write-off of its investment in a small software company. The write-off totaled approximately \$500,000 for the fiscal year; \$350,000 was taken in the third quarter of fiscal 1986.
17. See footnote 5.
18. SEI's loss included a one-time charge to operations consisting primarily of capitalized software costs and goodwill that were originally recorded as part of the 1982 acquisition of TMI Systems and the 1984 acquisition of the Financial Services Group of Index Systems.
19. Shared Medical Systems' loss was due to a write-off of its investments related to Shared Medical Systems International's (SMSI) Japanese subsidiary Ni Hon. SMSI has discontinued the Japanese operation.
20. Worlco Data's loss for the quarter was attributed to a major expansion of personnel and computer systems in conjunction with a move to new facilities. In addition, the company experienced a reduction of margins in the circulation fulfillment area due to cutbacks at some publications and discontinued operations at others.
21. Worlco Data's third quarter loss was due to delays in the completion of a custom turnkey system, developed for a large floor-covering company. Worlco planned to sell the system, once completed, to other floor-covering companies.



Network/Electronic Information Services Sector Analysis



Network/Electronic Information Services Sector Analysis

A

Network/Electronic Information Services Market, 1987

INPUT defines network services as valued-added networks (VANs), electronic mail, and electronic data interchange (EDI) services. Electronic Information Services (EIS) is defined as on-line data base access to specific information via terminal-based inquiries, such as stock prices and airline schedules; on-line news services that offer current information, either general or for a specific category (i.e., financial or political); and videotex services, which provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, and travel reservations.

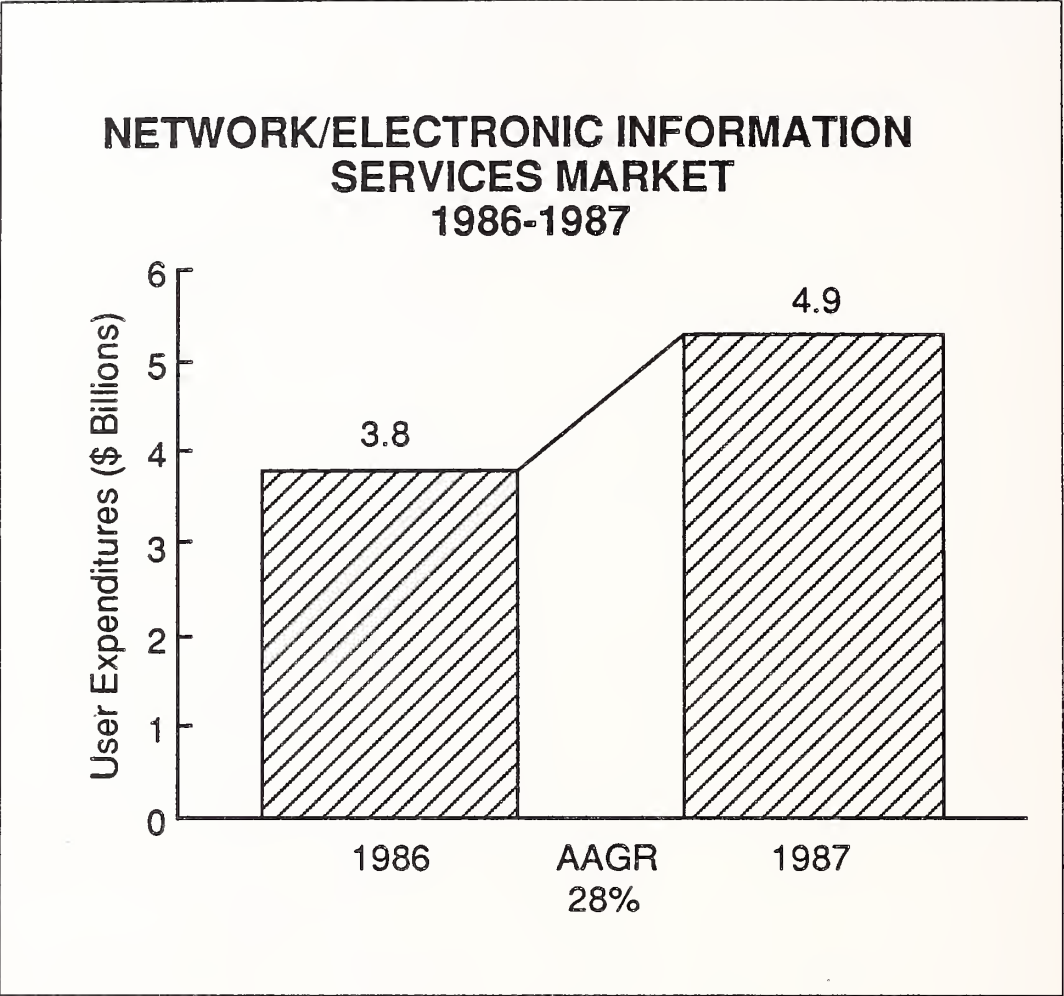
In 1987, INPUT separated network/electronic services from the total processing services markets in recognition of the recent strength in the on-line information services markets.

The network/electronic information services market in 1987 was \$4.9 billion, which represented a 28% growth rate over the \$3.8 billion market in 1986. See Exhibit VI-1.

In 1987, network/electronic services represented 7.0% of the total information services market of \$67 billion.

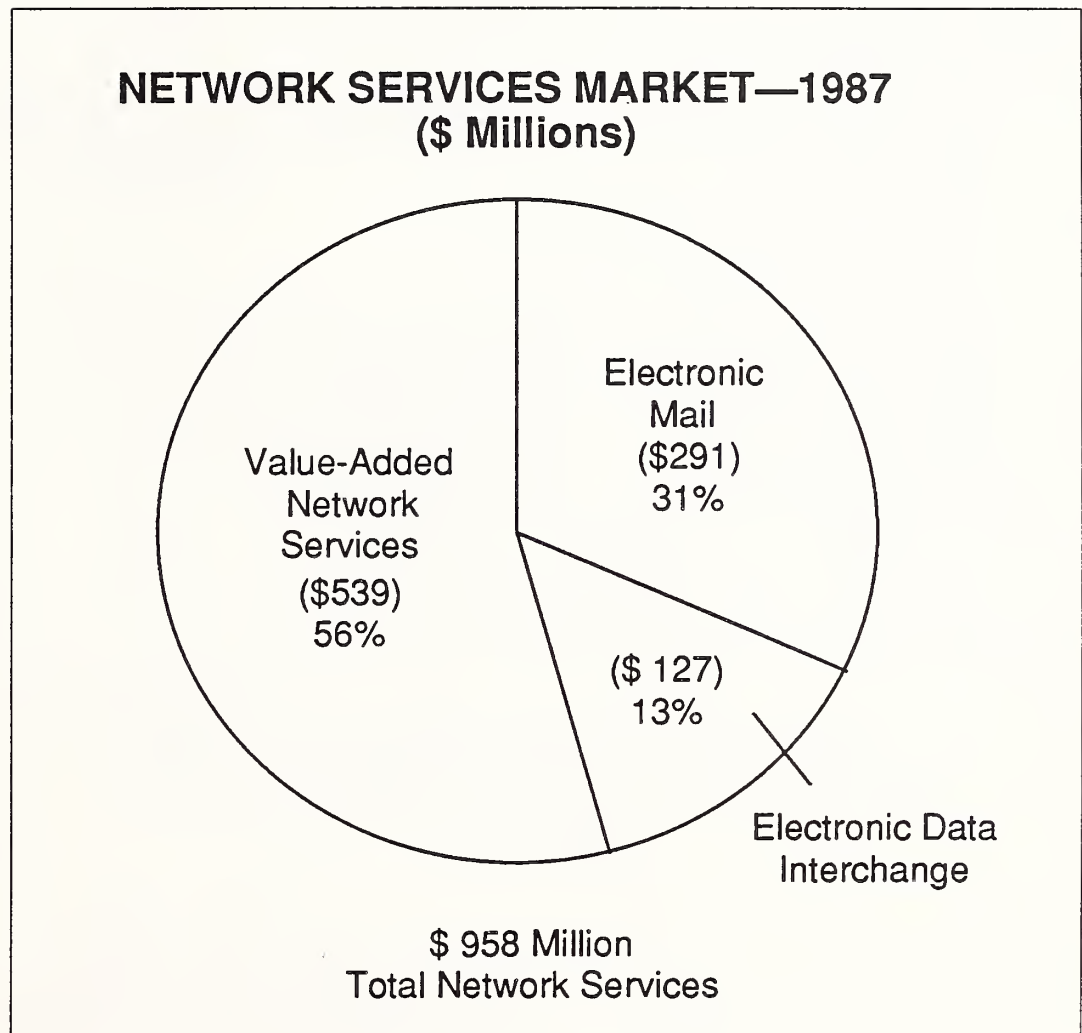
Market size information on vertical and cross-industry network/electronic services markets is provided in a series of separate reports by INPUT, classified by the two-digit groups of the standard industrial classification (SIC) codes of the federal government.

EXHIBIT VI-1



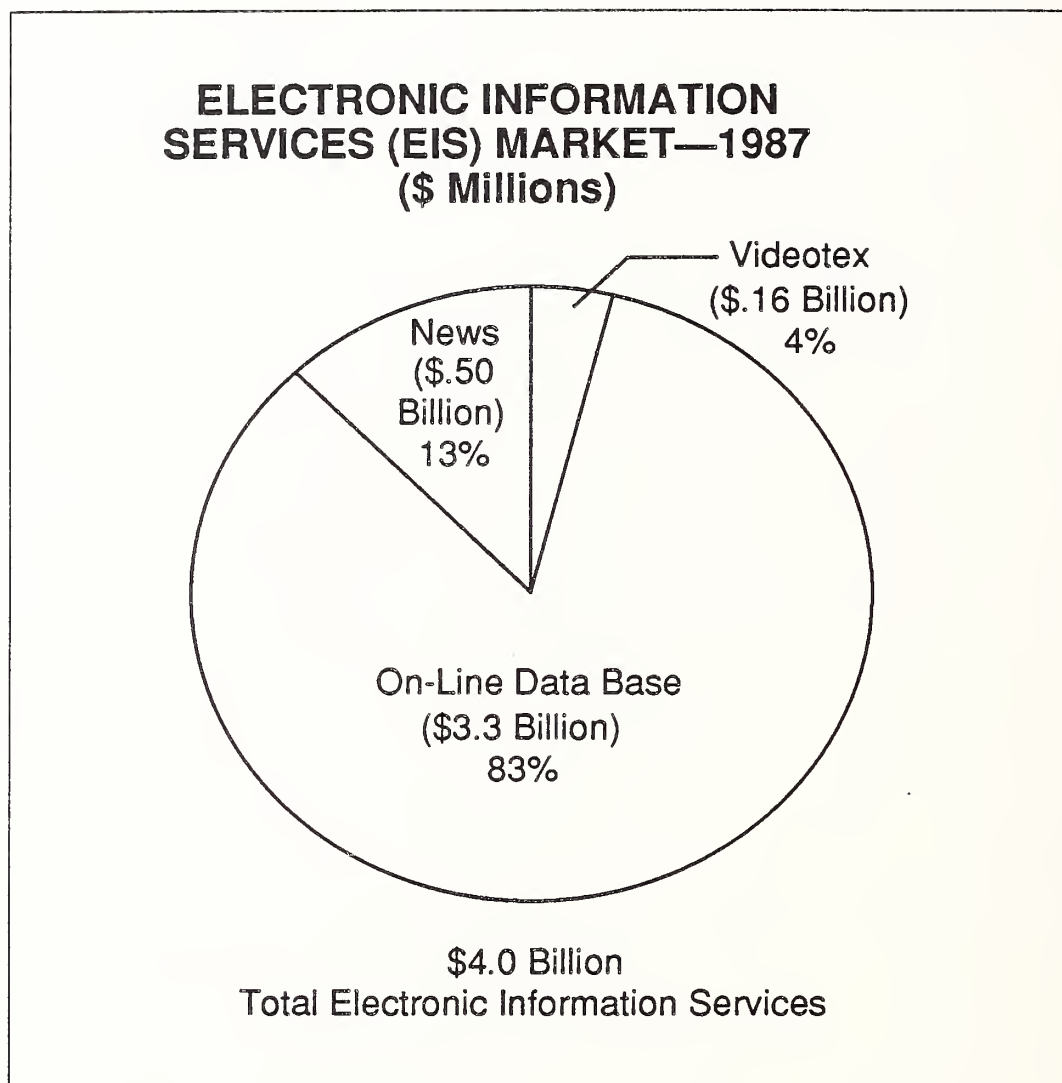
Within the network services delivery mode, the market for value-added network services (VANs) was \$539 million in 1987, as shown in Exhibit VI-2. In the same year, the market for electronic mail was \$291 million, and the market for electronic data interchange (EDI) totaled \$127 million. The total market for network services in 1987 was \$958 million.

EXHIBIT VI-2



The market for electronic information services (EIS) in 1987, as shown in Exhibit VI-3, was \$4.0 billion. Within the EIS market in 1987, the on-line data base delivery market was \$3.3 billion, on-line new delivery totaled \$502 million, and the market for videotex services was \$160 million.

EXHIBIT VI-3



Forecast:

INPUT forecasts that the market for network/electronic information services will increase from \$6.2 billion in 1988 to \$17.4 billion in 1993, for a CAGR of 23%, as shown in Exhibits VI-4, VI-5, and VI-6.

EXHIBIT VI-4

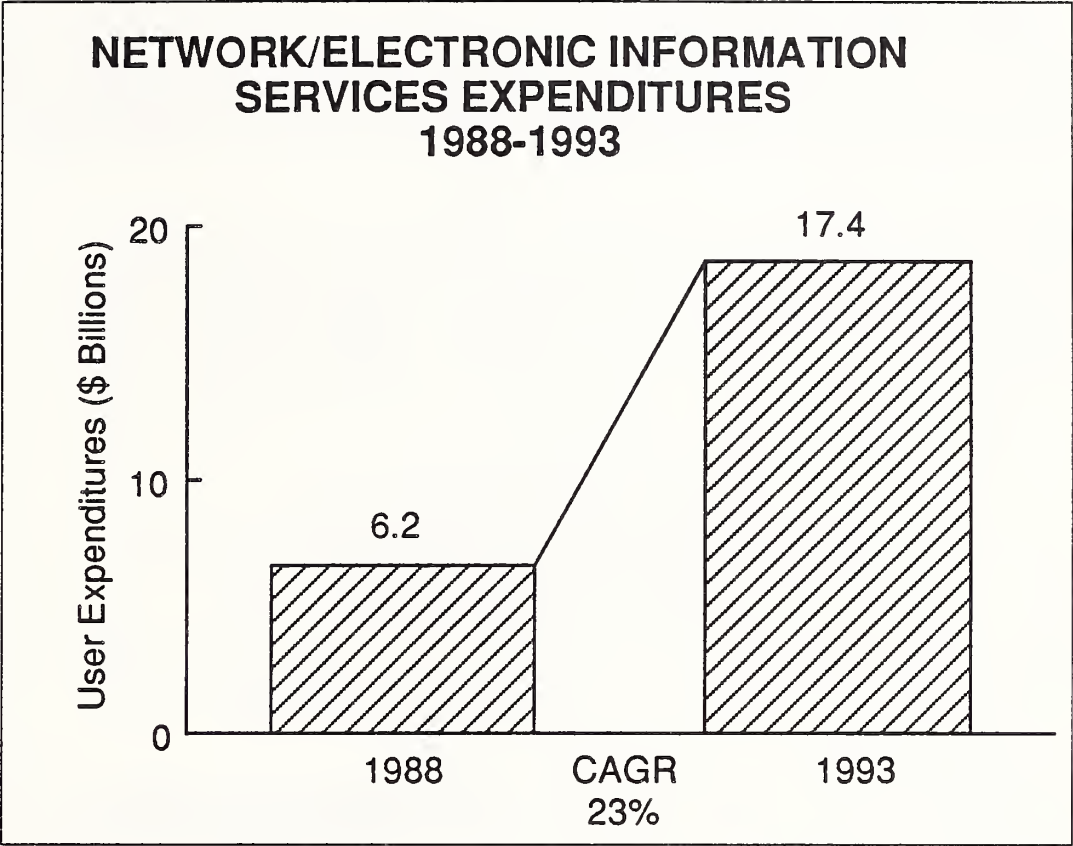


EXHIBIT VI-5

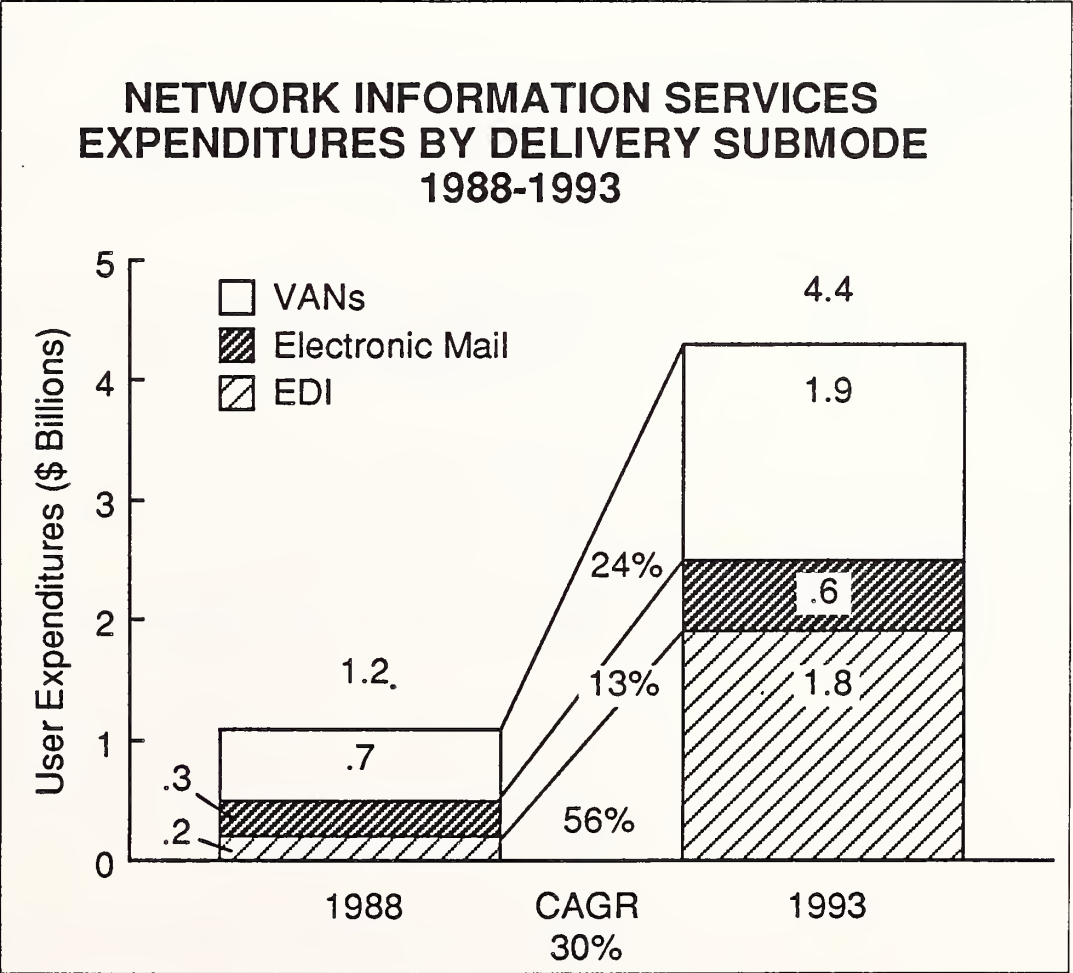
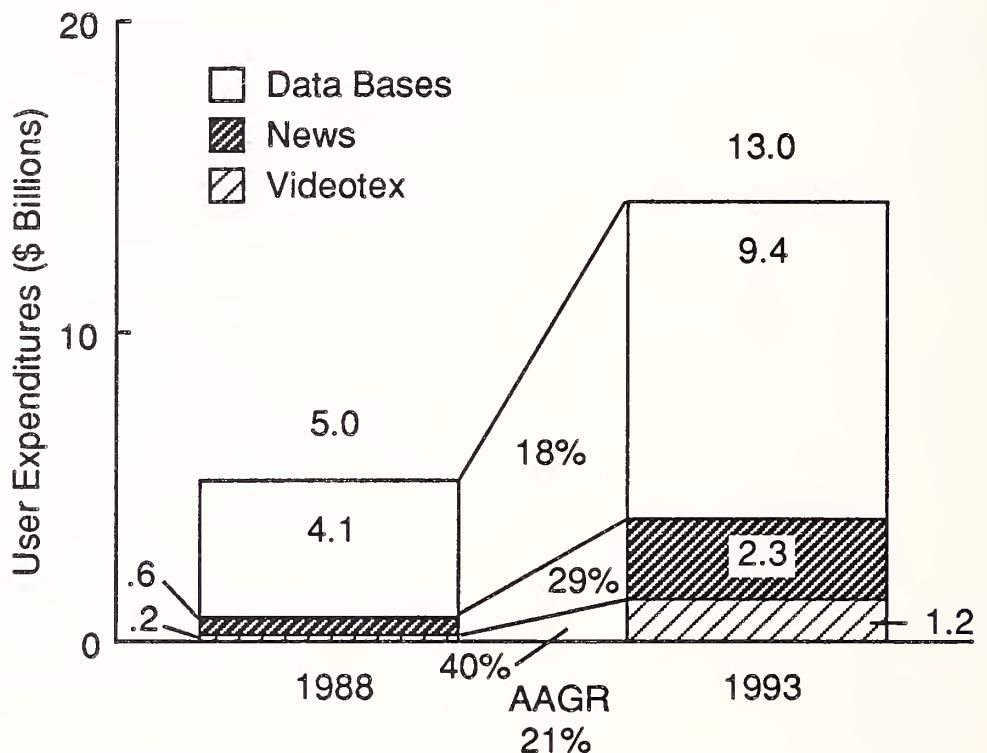


EXHIBIT VI-6

ELECTRONIC INFORMATION SERVICES EXPENDITURES BY DELIVERY SUBMODE 1988-1993



Driving forces that will continue to positively impact growth in network/electronic information services, as shown in Exhibit VI-7, include the following.

- **PC Population:** The large installed base of several million standalone PCs will increasingly need to be interconnected, which will drive the market for LAN-based market services.
- **Consumer Information Services:** The consumer market represents a largely untouched market for companies now providing on-line data bases to the corporate market.
- **ISDN:** The integration of voice and data in public networks will create new market opportunities for vendors of telecommunications applications.
- **EDI Popularity:** The Electronic Data Interchange market is expected to show rapid growth over the next several years as companies move to real-time contacts with vendors and customers to enhance management control and reduce paper costs.
- **Wide-Area Networking:** The market for wide-area networking is being enhanced by the increasing adoption of the X.25 standard.

- Businesses need rapidly available, up-to-date electronic information.
- RBOC Entry: Expected entry of RBOCs into the network services market will expand the potential customer base for electronic information services.
- Voice Information Services: The technology is increasingly becoming available for text-to-voice conversion and for sophisticated voice response systems that could substantially increase the efficiency of current communications services.

EXHIBIT VI-7

**NETWORK/ELECTRONIC
INFORMATION SERVICES MARKET—
DRIVING FORCES**

- PC Population
- Consumer Information Services
- ISDN
- EDI Popularity
- Wide-Area Networking
- Business Need for Rapidly Available Electronic Information
- RBOC Entry
- Network Management Services
- Voice Information Services

Inhibiting forces that will negatively impact growth in network/electronic information services markets, shown in Exhibit VI-8, include:

- **Data Overload:** With thousands of data bases now available along with approximately 300 on-line data delivery services, there is the question of potential market saturation in the major markets for such services; the corporate and academic. This will probably lead to additional mergers and acquisitions in this area over the near term.
- **CD-ROM as Alternative:** CD-ROM as a form of local data base access is directly competitive with many types of on-line data base delivery systems. In particular, CD-ROM turnkey solutions are finding strong acceptance in the academic library environment.
- **Profitability Questions:** The leading VANs are finding it difficult to achieve respectable returns on investment in the network services markets. With the likely entrance of several of the RBOCs in these markets over the next few years, there could be some considerable restructuring in these markets.
- **Vendor Consolidation (Short-Term Confusion):** In particular, the entry of the RBOCs into the network services markets could lead to some vendor consolidation.

EXHIBIT VI-8

**NETWORK/ELECTRONIC
INFORMATION SERVICES MARKET—
INHIBITING FORCES**

- Data Overload
- CD-ROM as Alternative
- Profitability Questions
- Vendor Consolidation
(Short-Term Confusion)

B**Network Services
Market Competitive
Analysis**

See Exhibit VI-9 for market share information on the total market for network/electronic services, both private and public vendors. Revenue data represents only the network/electronic services revenues for each company.

EXHIBIT VI-9

**MAJOR VENDORS' SHARES OF NETWORK/
ELECTRONIC INFORMATION SERVICES
MARKET—1987**

Company Name	1987 Revenue (\$ Millions)	Market Share (Percent)
Equifax, Inc.	507	10
TRW Information Services	340	6
Quotron Systems (Citicorp)	272	5
McGraw-Hill, Inc.	264	5
Mead Data General	230	5
McDonnell Douglas Information Systems Group	195	4
CUC International, Inc.	200	4
Telerate, Inc.	180	4
GTE Telenet Communication Corp.	175	4
Control Data Corporation	145	3

Exhibit VI-10 shows the leading value-added network companies in 1987.

EXHIBIT VI-10

**LEADING VALUE-ADDED
NETWORK SERVICES VENDORS
1987**

McDonnell Douglas Network Systems
Company

GTE Telenet Corporation

IBM Information Network

CompuServe, Inc.

GE Information Services Co. (GEISCO)

Computer Sciences Corporation

Western Union Corporation

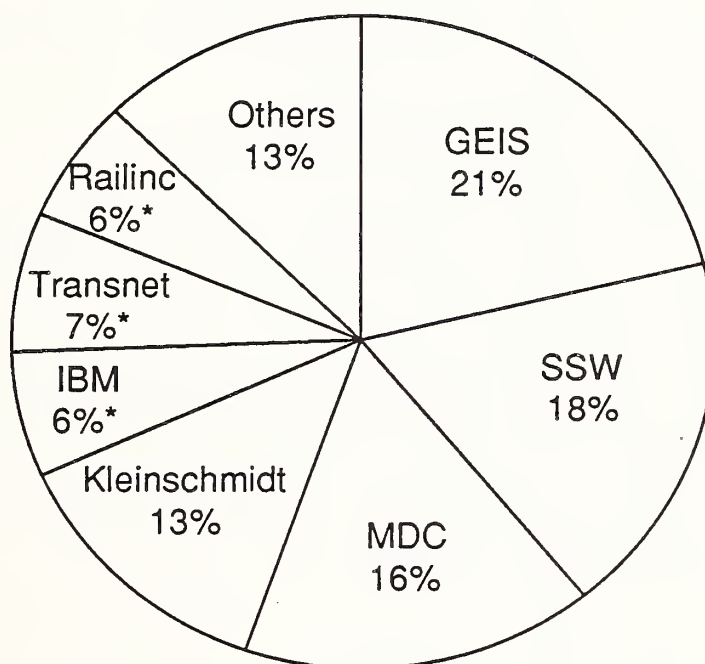
Wang Information Services Company

MCI Data Transport (WISC)

See Exhibit VI-11 for the leading companies in the electronic data interchange market.

EXHIBIT VI-11

**EDI NETWORK/PROCESSING SERVICES
MARKET SHARE—1987**



Excludes Private
Networks,
EMC, Interface,
Federal

See Exhibit VI-12 for leading companies in the public electronic mail market.

EXHIBIT VI-12

**PUBLIC ELECTRONIC MAIL
MARKET LEADERS—1987**

GTE Telenet Communications
Corporation

CompuServe, Inc.

Western Union Corporation

McDonnell Douglas

MCI Communications

GE Information Services Company

RCA

AT&T

Exhibit VI-13 depicts the leading companies in the on-line data base services market.

EXHIBIT VI-13

**ON-LINE DATA BASE
INFORMATION
SERVICES MARKET LEADERS
1987**

TRW Information Services

McGraw-Hill, Inc.

Quotron Systems, Inc.

CUC International, Inc.

Mead Data Central

Control Data Corporation

IDC (Interactive Data Corporation)

Dun & Bradstreet Corp., The

Telerate, Inc.

See Exhibit VI-14 for the leading companies in the electronic news information services market.

EXHIBIT VI-14

**ELECTRONIC NEWS INFORMATION
SERVICES MARKET LEADERS
1987**

Dow Jones & Co., Inc.

Telerate, Inc.

Mead Data Central

Quotron Systems Inc.

Lockheed Corporation

In the emerging videotex market, Digital Equipment has been the most successful to date, with an emphasis on the delivery of corporate information services.

Section E of this chapter provides revenue and net income information on the public companies that represent pure players in the network services/electronics market.

C

**Electronic Data
Interchange**

Electronic Data Interchange (EDI) continues to be one of the fastest-growing markets in the information services industry.

The commercial and federal EDI markets consist of network and processing services, software, and professional services.

EDI, as defined by INPUT, is the intercompany electronic transfer of business information between applications conforming to a public or de facto standard. The information exchanged represents standard business documents such as invoices, purchase orders, and logistical information.

INPUT projects that user expenditures for EDI network services, when combined with software and professional services, reached nearly \$131 million in 1987, and will grow to nearly \$2 billion by 1993, for a 56% CAGR. This forecast includes the electronic medical claims and batch insurance interface varieties of EDI and federal EDI.

However, INPUT believes that the total EDI market could be three or more times larger than these figures indicate. When internal, related EDI-stimulated work is considered as well as EDI offered as a customer service and EDI products included in vendor-to-vendor contracts for professional services and commercial systems integration work, the market could be much larger.

Currently, the largest users of EDI are in the discrete manufacturing, distribution, and transportation industries.

EDI can be provided in several ways: point-to-point between trading partners, on private networks, or through third parties.

Principal third-party EDI network service providers include: Value-Added Networks (VANs); Remote Computing Services companies (RCS); interchange carriers (IXC), such as AT&T; and industry associations that operate or manage EDI services for their members. INPUT expects the RBOCs will enter the network/processing market for EDI delivery within the next two years.

Some of the key benefits of EDI usage involve the time value of information, cost avoidance, and better inventory control; in particular, the enhancement of Just-In-Time Inventory approaches.

A current issue that may be impeding the current rate of implementation of EDI network solutions is the issue of emerging standards; in particular, the expected migration from the dominant American National Standards Institute's X12 EDI standard to an emerging international standard called EDIFACT.

D

On-Line Information Services

The current growth momentum in electronic information services is reflected in the fact that information publishing, in particular, has become a "hot" takeover market. It is the large data bases and either existing on-line delivery or the potential for transforming them into electronic data services that is creating much of the takeover interest in Macmillan and has lead in recent years to the takeover of Prentice-Hall, Addison-Wesley Publishing Co., Grolier and I.M.S. International, a pharmaceutical market research company. McGraw-Hill, which is the last remaining major independent publishing company, has also been subject to recent takeover interest.

E

Public Network/ Electronic Services Company Revenue and Net Income Performance

Annual growth in revenues from public electronic information services vendors was 76% in 1984. This period represented the high-growth introductory phase of the electronic information services market. Annual growth rates in 1986 and 1987 were 42% and 32%, respectively.

CCX Network and Telerate are currently the fastest-growing public companies in the electronic information services group. CCX Network provides services used in direct marketing; Telerate provides financial information worldwide. See Exhibits VI-15 and VI-16.

Growth in net income earned by public electronic information services vendors has increased steadily during the last few years. Annual growth rates for 1985, 1986, and 1987 were 19%, 24%, and 45% respectively, as these vendors developed expertise in the industry. See Exhibit VI-15.

Telerate, the largest and most profitable of these companies, achieved a 22% profit margin in 1987. Profitability for the group was approximately 12%.

See Chapter IV of this report for more information on successful network/electronic services companies.

EXHIBIT VI-15

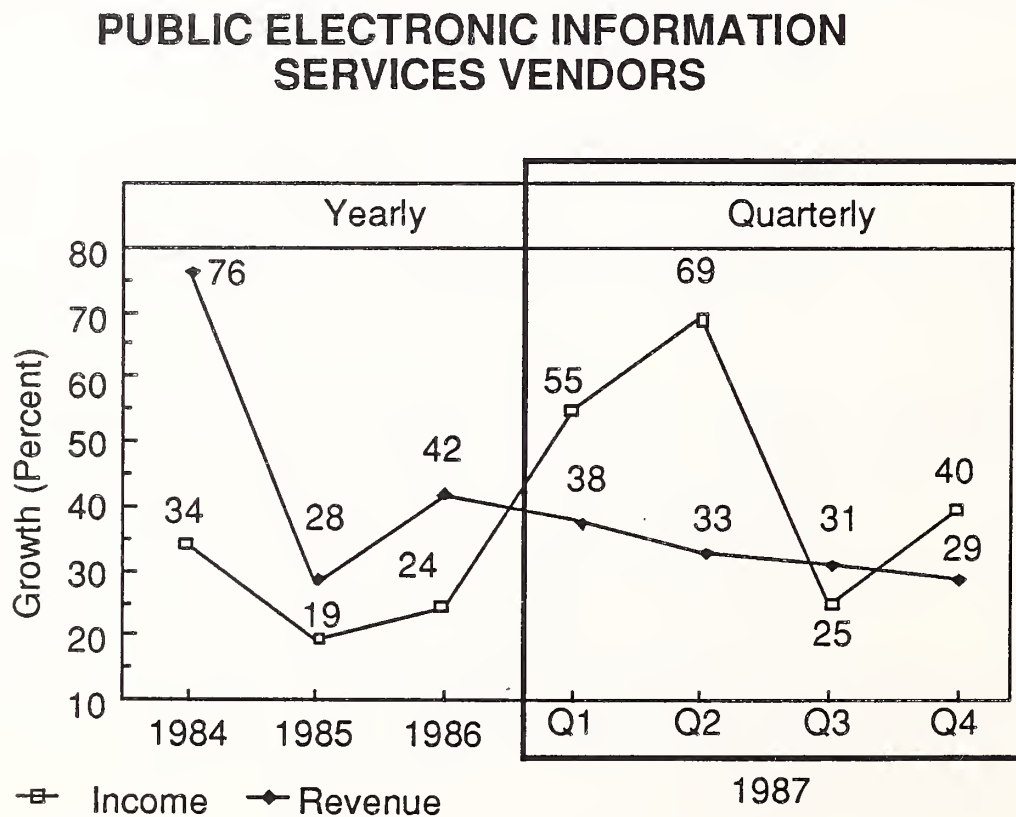


EXHIBIT VI-16

REVENUES OF PUBLIC ELECTRONIC INFORMATION SERVICES COMPANIES

COMPANY NAME	FISCAL YEAR END	REVENUE (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
CCX NETWORK	12-31	4530	5047	5068	9221 ¹	23866	8398	8918	14837	15928	48081	101	105	115
CUC INTL	01-31	26842	35208	37801	41908	141759	45153	48867	51082	53400	198502	40	33	31
EPSILON	05-31	13686	14896	11805	13121	53508	11680	10604	9391	13530	45205	-16	-16	-8
INFO RESOURCES	12-31	21319	21773	23824	26718	93634	26030	28205	26077	25139	105451	13	10	1
LCS INDUSTRIES	09-30	9201	7981	10529	8883	36594	9193	8557	8941	9303	35994	-2	-2	-6
TELERATE	09-30	50068	54300	61001	66908	232277	72767	79834	85985	97167	335753	45	44	43
TOTALS		125646	139205	150028	166759	581638	173221	184985	196313	214467	768986	32	31	30

* INPUT ESTIMATE

EXHIBIT VI-17

NET INCOME OF PUBLIC ELECTRONIC INFORMATION
SERVICES COMPANIES

COMPANY NAME	FISCAL YEAR END	NET AFTER TAX INCOME (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
CCX NETWORK	12-31	333	463	543	512	1851	401	685	806	1310	3202	73	85	101
CUC INTL	01-31	1342	1988	2451	2723	8504	3309	4202	4670	5219	17400	105	97	91
EPSILON	05-31	37	-1108 ²	87	320	-664	-86	-132	-101	575	256	139	149	16
INFO RESOURCES	12-31	2200	2500	2637	2665	10002	1420	1172 ³	-2367	-3263 ⁴	-3038	-130	-157	-206
LCS INDUSTRIES	09-30	382	-100	593	310	1185	372	28	-506	29	-77	-106	-156	-153
TELERATE	09-30	9181	10053	11073	12915	43222	15492	17304	19161	23260	75217	74	75	77
TOTALS		13475	13796	17384	19445	64100	20908	23259	21663	27130	92960	45	42	32

* INPUT ESTIMATE

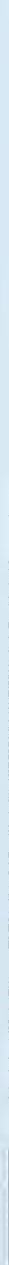
6 COMPANIES

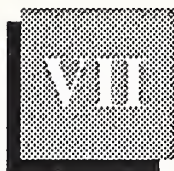
Electronic
Information Services
Footnotes

1. CCX Network's revenue included the acquisitions of BSA (NJ) and Southwark Computer Services (London, England).
2. Epsilon's net loss reflected the recognition of costs associated with the termination of the company's role as servicing agent for Pan American's World Pass Program.
3. Information Resources' drop in earnings the first two quarters of 1987 was attributed to expenses related to the introduction of INFOSCAN.
4. Information Resources' third- and fourth-quarter losses were attributed to costs associated with the defunct merger with Dun & Bradstreet, the write-off of a lease obligation, and INFOSCAN expenses.



Software Products Sector Analysis





Software Products Sector Analysis

A

Software Products Market, 1987

Applications Software:

INPUT subdivided the applications software market in 1987 into three hardware platforms (mainframes, minicomputers, and workstations/PCs) and cross-industry and industry-specific submodes. Industry sectors are identified by two-digit standard industrial classification (SIC) codes used to define the economic activity contained in generic sectors such as process manufacturing, insurance, or transportation. INPUT provides market analysis on the industrial submodes in a series of separate reports.

In 1986, INPUT did not separate the minicomputer and mainframe applications software markets. As such, the 1986-1987 comparisons in these two categories are combined.

The total market for applications software products in 1987, representing end-user expenditures, was \$10.6 billion, which increased 24% from \$8.6 billion in 1986, as shown in Exhibit VII-1.

EXHIBIT VII-1

APPLICATIONS SOFTWARE PRODUCTS MARKET 1986-1987

Applications Software Product Markets	Source by Market SubModes (\$ Millions)		Total
	Mini/Mainframe	Workstation/PC	
1986	6,065	2,500	8,565
1987	6,990	3,600	10,590
Growth Rate (Percent)	15	44	24

Systems Software:

INPUT subdivides the systems software market into three submodes: systems control, data center management tools, and applications development tools. Two second-level modes are created for each of the above submodes: workstation/PCs and mini/mainframes. See Exhibits VII-2, VII-3, and VII-4.

EXHIBIT VII-2

WORKSTATION/PC SYSTEMS SOFTWARE MARKET 1986-1987

Workstation/PC Systems Software Market	Revenue Source by Workstation/PC Systems Software Submodes (\$ Millions)			Total
	Applications Development Tools	Systems Control	Data Center Management Tools	
1986	540	415	23	978
1987	711	590	68	1,369
Growth Rate (Percent)	32	42	196	40

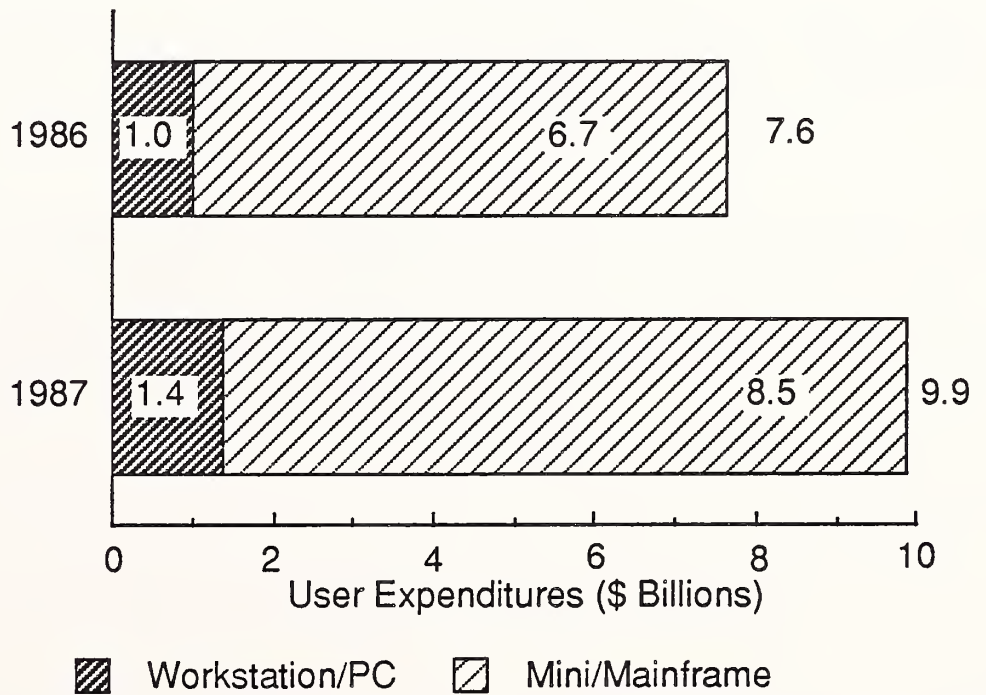
EXHIBIT VII-3

MINI/MAINFRAME SYSTEMS SOFTWARE MARKET 1986-1987

Mini/ Mainframe Systems Software Markets	Revenue Source by Systems Software Submodes (\$ Millions)			Total
	Applications Development Tools	Systems Control	Data Center Management Tools	
1986	2,390	2,645	1,615	6,650
1987	3,045	3,560	1,905	8,510
Growth Rate (Percent)	27	35	18	28

EXHIBIT VII-4

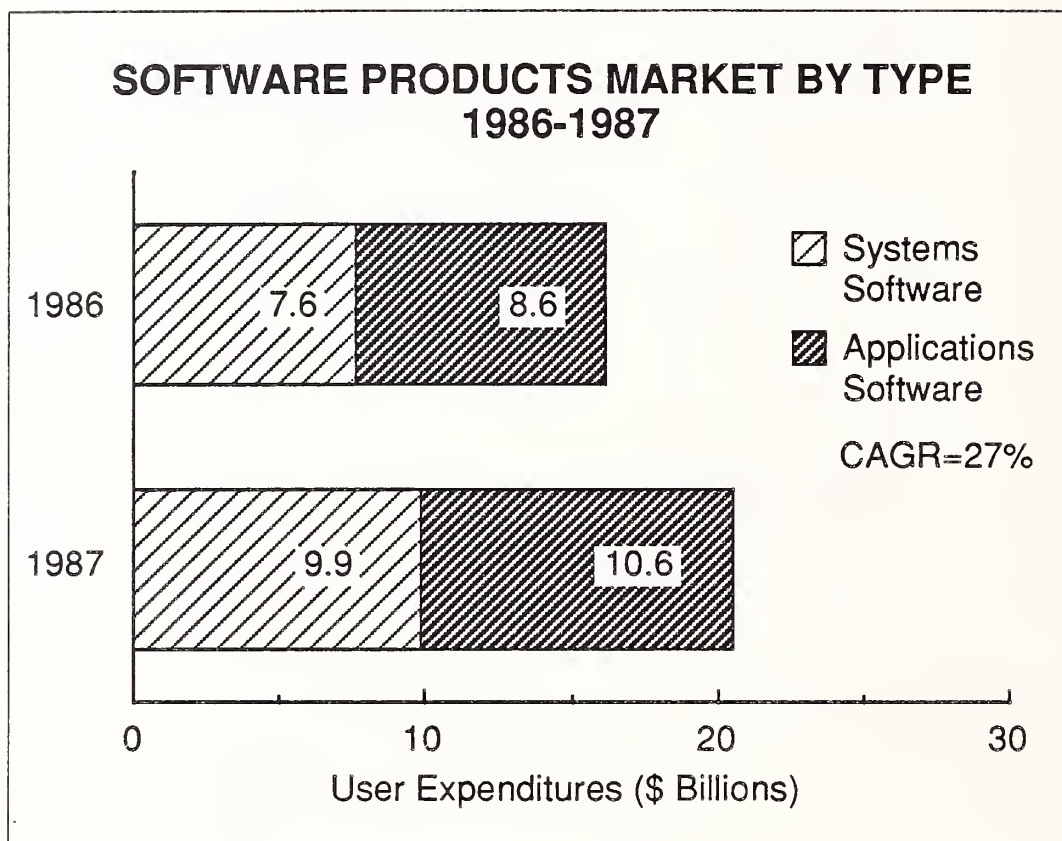
TOTAL SYSTEMS SOFTWARE MARKET BY PLATFORM SUBMODE 1986 - 1987



Total Software Products Market:

The total end-user market for software products in 1987 was \$20.5 billion, which expanded 27% from \$16.2 billion 1986, as shown in Exhibit VII-5.

EXHIBIT VII-5



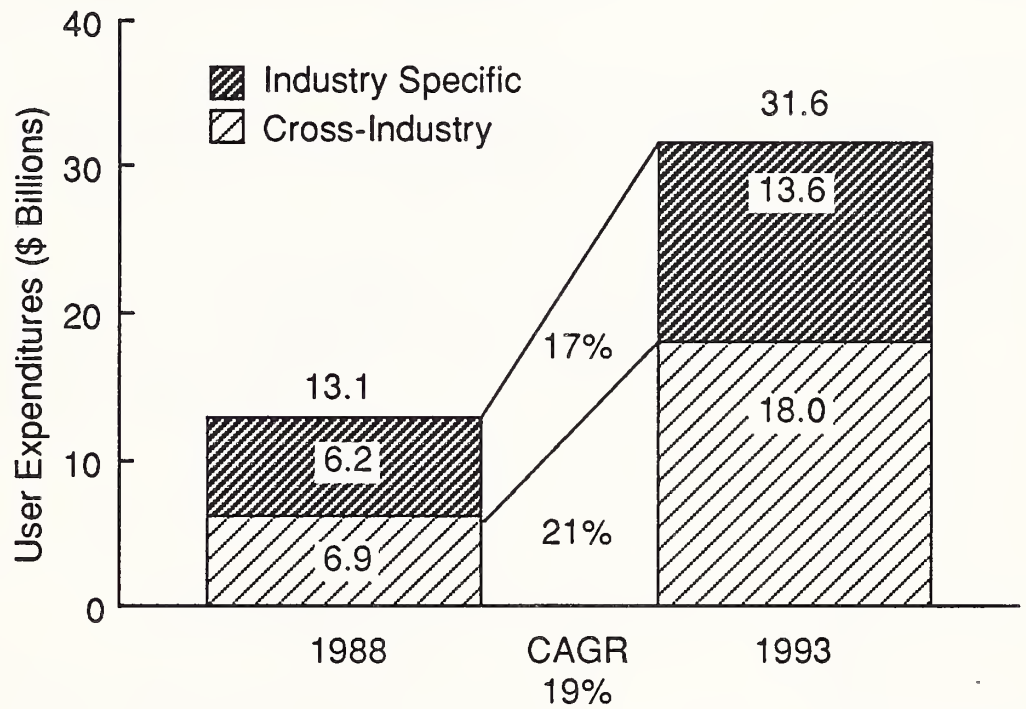
Software products represents a 31% share of the information services marketplace.

Forecast—Applications Software Products Market:

INPUT forecasts that the total market for applications software products will increase from \$12.6 billion in 1988 to \$30.1 billion in 1993, for an CAGR of 19%, as shown in Exhibit VII-6. The decline from the 24% growth rate in 1987 reflects INPUT's beliefs that there will be a product life cycle maturation in several of the applications software market segments.

EXHIBIT VII-6

APPLICATIONS SOFTWARE MARKET SUBMODES 1988-1993



Driving forces that continue to positively impact growth in the applications software products market are shown in Exhibit VII-7 and include the following:

- **CPU Population Growth:** The large installed base of personal computers, in particular, will need additional applications. In the corporate market, most personal computers are being utilized for only one or two applications. The number of applications needs to be increased to improve the efficiency of personal computers.
- **Standards:** As standards such as UNIX, SAA, and SQL are adopted, it will become easier to write software for a larger number of boxes. In addition, new standards in the area of applications development tools providing common user interfaces will increase software development productivity as well as provide for software portability.
- **Workstation Power:** The increasing power of the new workstation platforms is creating new market opportunities to write programs incorporating the new capabilities of these machines. In particular, the networking capabilities inherent in these computers is creating market opportunities for multitasking and multiuser applications.
- **Industry-Specific Thrusts:** Much of the applications software written in the 1970s was of the "plain vanilla" type. Now the demand is increas-

ing for software to solve in-depth industry solutions.

- **EIS/Other Emerging Niches:** The need is developing to provide free-form access to corporation information sources, including data bases, particularly for corporate decision-makers.
- **Application Complexity:** There is now a need to provide second and third generations of applications software for business, including more integration and embedded intelligence.

EXHIBIT VII-7

**APPLICATIONS SOFTWARE
PRODUCTS MARKET—
DRIVING FORCES**

- CPU Population Growth
- Standards
- Workstation Power
- Industry-Specific Thrusts
- EIS/Other Emerging Niches
- Application Complexity

Inhibiting forces that will continue to negatively impact growth in the applications software products market, as shown in Exhibit VII-8, include:

- **Mainframe Saturation:** The market growth rate for large computer systems has been slowing for several years. Much of the future market opportunity will be for mainframe replacements.
- **Declining Price Per Copy:** As the industry gets more competitive, it is causing software prices to decline, particularly in the mini and mainframe applications software markets. However, the level of merger activity is likely to accelerate, leading to industry consolidation, which could create a more stable pricing environment.
- **Product Life Cycles:** The shortening product life cycles, related in part to decreasing life cycles in hardware platforms, is creating demand,

particularly for applications software upgrades. However, there is also the related issue of whether or not the independent applications software developers are creating sufficient profits to support the high levels of research and development spending to compete in a crowded market.

- **Crowded Market Niches:** Many applications products represent mature markets where only two or three players can succeed. In addition, major R&D expenditures will be required to remain competitive.

EXHIBIT VII-8

APPLICATIONS SOFTWARE PRODUCTS MARKET— INHIBITING FORCES

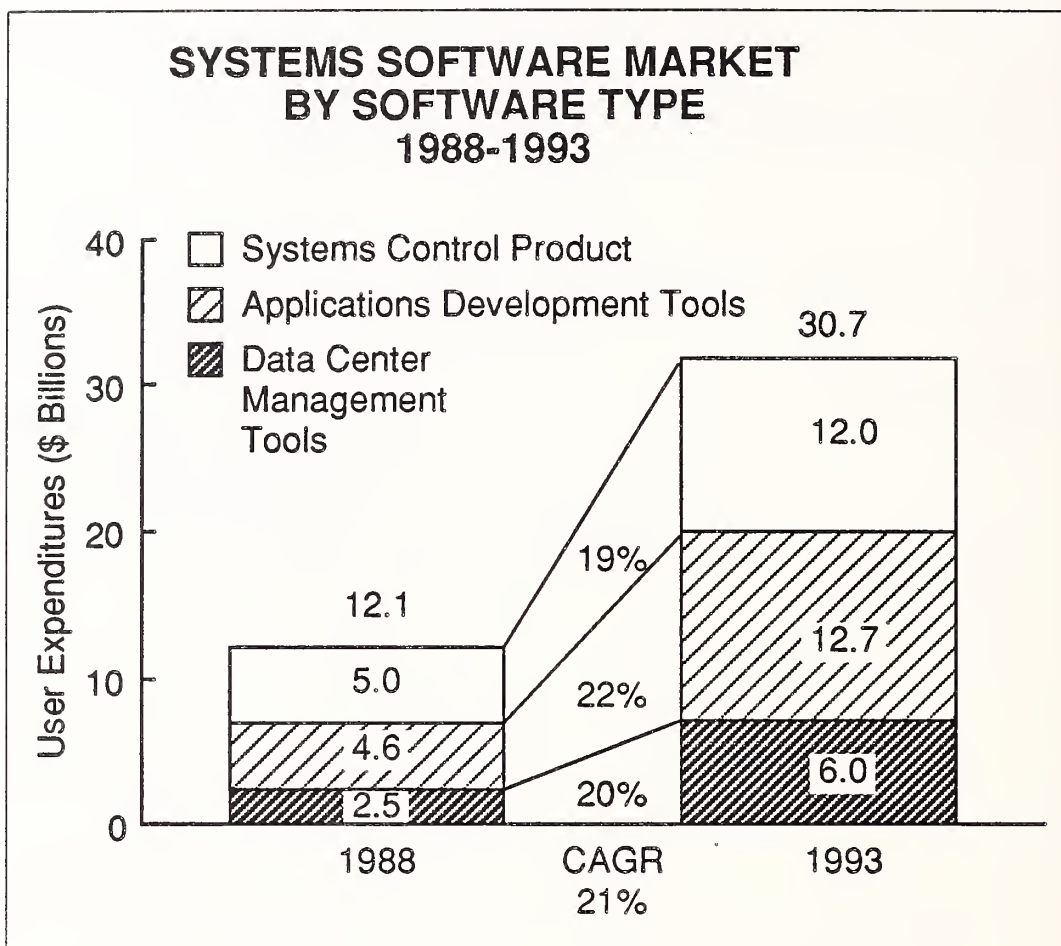
- Mainframe Saturation
- Declining Price per Copy
- Product Life Cycles
- Crowded Market Niches

Systems Software Market:

INPUT forecasts that the total systems software market, by software type, will increase from \$12.1 billion in 1988 to \$30.7 billion in 1993, for a total average annual growth rate of 21%. See Exhibit VII-9. For 1988, INPUT projects a 22% growth rate in the systems software market, and a 20% compound annual growth rate from 1989 through 1993.

The market for applications development tools is expected to increase from \$4.6 billion in 1988 to \$12.7 billion in 1993, for a compound annual increase of 19%. The data center management tool market is projected to expand at an average annual growth rate of 20%, from \$2.5 billion in 1988 to \$6.0 billion in 1993. Systems control product expenditures are projected to increase from \$5.0 billion in 1988 to \$12.0 billion in 1993, for a compound annual growth rate of 19%.

EXHIBIT VII-9



Driving forces that are continuing to positively impact growth in the systems software products market, shown in Exhibit VII-10, include the following:

- **Staging for New Applications Software Growth:** The increasing demand for more-complex applications software solutions is fueling the demand for new operating systems, automation of the data center management process and most of all for new applications development tools.
- **Data Center Management Tools:** As data centers become more complex, including the trend to data center consolidation, one place to reduce manpower is by investing in automation tools to more efficiently operate and tune.
- **RDMS:** Most new computer systems specifications today require the new relational data base management systems products.
- **SAA:** The portability benefits of SAA will encourage independent software developers to create new software to meet the SAA requirements.

- **Cooperative Processing:** The ultimate goal of a truly distributed processing environment is cooperative processing, which maximizes the efficiencies of computer networks. This development will require new generations of software products, particularly in the areas of network operating and management systems.
- **Image Processing:** To reduce the increasing paper overflow problem, systems solutions such as image processing, which involve optical storage solutions, will continue to gain acceptance.
- **CASE/4GL:** The need to improve software development productivity via 4GL languages and increasingly integrated structured programming methodologies, such as CASE, will continue to gain in popularity.
- **Standards (SQL/UNIX, etc.):** Increasing emphasis on standards and open systems should fuel the demand for new generations of software that conform to the emerging standards.
- **Consolidation:** The trend to consolidation in the systems software industry (i.e., Computer Associates' major acquisitions in recent years) could help provide stability in the industry as well as a pricing umbrella.

EXHIBIT VII-10

**SYSTEMS SOFTWARE PRODUCTS
MARKET—DRIVING FORCES**

- Staging for New Applications Software Growth
- Data Center Management Tools
- RDMS
- SAA
- Cooperative Processing
- Image Processing
- CASE/4GL
- Standards (SQL/UNIX)
- Consolidation

Inhibiting forces that will continue to negatively impact growth in the systems software products market, shown in Exhibit VII-11, include:

- **Mainframe Saturation:** The slowing growth rate in the mainframe computer market will have a dampening effect on the rate of market expansion for operating systems software.
- **Competition and Price Pressures:** With the maturing in the markets for certain mainframe systems software products, weaker competitors could create price instability.
- **Declining Software Price Per Copy:** The trend to lower software prices, particularly in the mainframe systems software area, should help stimulate demand.
- **AS/400 DBMS Negated:** The embedded DBMS functionality in recent releases of IBM systems software could reduce the market potential for third-party vendors in this market. Also, the confusion over IBM's long-range DB2 plans may delay decision making by corporate customers until they see what they can get from IBM.

EXHIBIT VII-11

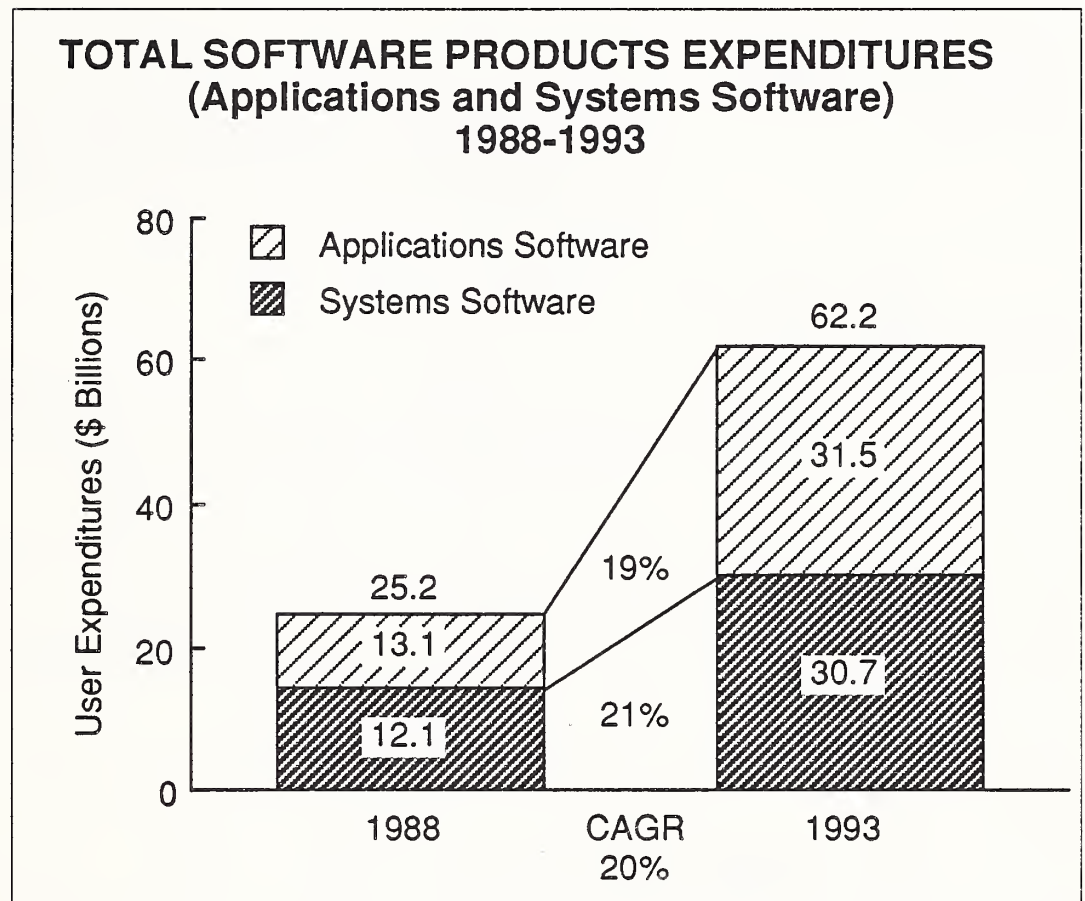
SYSTEMS SOFTWARE PRODUCTS MARKET—INHIBITING FORCES

- Mainframe Saturation
- Competition and Price Pressures
- Declining Software Price per Copy
- AS/400 DBMS Negated

Total software products market:

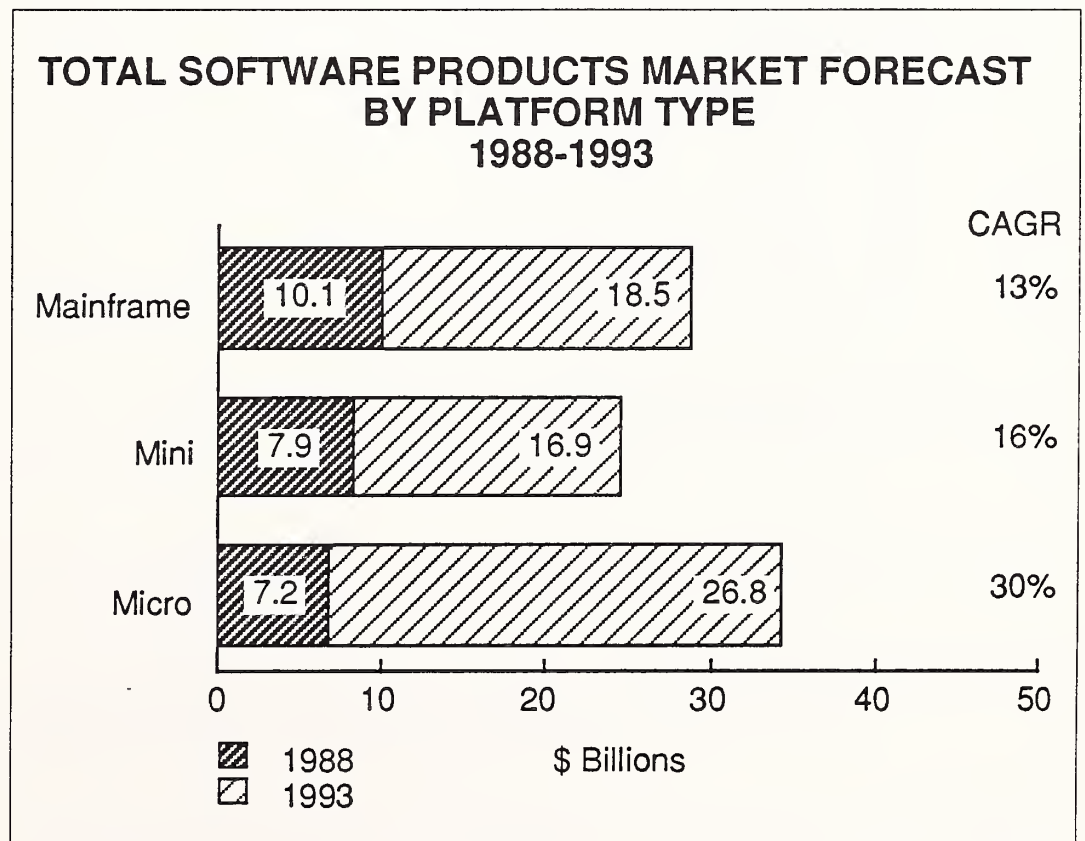
As shown in Exhibit VII-12, INPUT forecasts that the total market for software products (applications and systems software) will grow from \$25.2 billion in 1988 to \$62.2 billion in 1993, reflecting a compound annual growth rate (CAGR) of 20%. These figures reflect the combined impact of the need to increase business efficiencies through more in-depth, industry-specific software solutions, counterbalanced to some extent by a possible plateauing in demand for certain generic applications.

EXHIBIT VII-12



INPUT's total software products market forecasts by platform type are included in Exhibit VII-13.

EXHIBIT VII-13



B**Software Products
Market Competitive
Analysis**

See Exhibits VII-14 and VII-15 for market share information on the total market for applications and systems software products, including private and public vendors. Revenue data represents only the applications or systems software revenues for each company. The revenue figures reflect INPUT's estimates where specific information is not available from the vendor.

EXHIBIT VII-14

MAJOR VENDORS' SHARES OF APPLICATIONS SOFTWARE MARKET—1987

Company Name	1987 Revenue (\$ Millions)	Market Share (Percent)
IBM	774	5
Lotus Development Corp.	396	2
Digital Equipment Corp.	195	2
Dun & Bradstreet Corp.	170	2
Management Science America, Inc.	169	2
Unisys Corp.	165	2
Computer Associates International, Inc.	165	2
Hewlett-Packard	125	1
Wang Laboratories	105	1
Microsoft Corporation	105	1
Word Perfect Corporation	100	1
Ashton-Tate	95	1

EXHIBIT VII-15

MAJOR VENDORS' SHARES OF SYSTEMS SOFTWARE MARKET—1987

Company Name	1987 Revenue (\$ Millions)	Market Share (Percent)
IBM Corporation	2,325	28
Digital Equipment Corp.	740	9
Unisys Corp.	420	5
Computer Associates International, Inc.	250	3
Hewlett-Packard Company	190	2
Ashton-Tate	170	2
Wang Laboratories	150	2
NCR Corporation	145	2
Microsoft Corporation	135	2
Cincom Systems	122	1
Novell, Inc.	120	1

Section E of this chapter provides market share rankings on publicly owned companies (pure players) providing systems and applications software products.

C

Applications Software Products Market and Trends

Leading trends in applications software products and usage include:

- Inclusion of de facto file format standards in new applications products for facilitating document interchange among multivendor hardware and software systems is occurring.
- Portable applications based on open operating systems and computer and network architectures; in particular, the National Bureau of Stan-

dards' Applications Portability Profile (APP), which complements the seven building blocks of GOSIP, represents a key benchmark for building such applications.

- Network applications, particularly for LAN application servers, are also growing rapidly.
- An emphasis on total solutions, particularly in larger vertical markets, is leading to an increase in development and marketing alliances between ISDs (independent software developers) and hardware manufacturers. The new IBM AS/400 product introduction, with its emphasis on vertical markets, is likely to become a prototype for future IBM and for other computer systems vendor product introductions.
- Executive information systems (EIS), which improve flexibility of use of corporation information resources, will be used.
- Applications software segments expected to be in strong demand over the next few years include office systems, financial analysis, and industry-specific applications.

D

Systems Software Market and Trends

Trends in the systems package market include:

- Operating systems that incorporate an open systems architecture
- Implementation of various networking standards, fueled in part by the federal government GOSIP mandate for OSI network protocol standards in future government procurements (Other software standards important to federal agencies include: POSIX, Ada Language, UNIX, SQL, and standardization of software development)
- Application development tools, including 4GL (DBMS, screen formatters, report generation tools, etc.), object-oriented programming languages for building more visually oriented applications, and CASE tools to improve the software developer's productivity
- Use of standard, graphical user interfaces, which has also lead to the pursuit of software protection for look-and-feel graphical interfaces
- Systems software for newer information systems technologies such as image processing and voice-to-text transmission
- Communications gateway software to facilitate access to total companywide information resources
- Security/encryption software solutions

- Systems software product segments where demand is expected to be particularly strong over the next few years include data base management systems, network management and network connectivity software solutions, and application development tools

E

Public Software Products Company Revenue and Net Income Performance

Applications Software:

At the end of 1987, public companies in the applications software products sector showed 30% annualized growth compared to 23% in 1986.

Net income for the public applications software products sector showed a decrease of 16% in 1987, compared to the strong growth rate of 53% in 1986, as shown in Exhibit VII-16. Of the 23 companies tracked in INPUT's index of public applications software companies, 19 companies taken as a group showed an average increase in net income of 82%, suggesting that overall, it was a strong year in terms of profitability for the public applications software companies. See Exhibits VII-17 and VII-18 for specific company revenue and growth performance levels.

Aside from problems unique to a few specific companies, and the losses at Silvar-Lisco, which are probably related more to increasing competition in the CAE markets, the major negative impact to the overall net income average growth was the drop in earnings at MSA, primarily attributed to a change in accounting methods.

The 1987 net profit margin for the public applications software group was 5%. However, excluding MSA's results, the applications software products group attained a 13% profit margin.

EXHIBIT VII-16

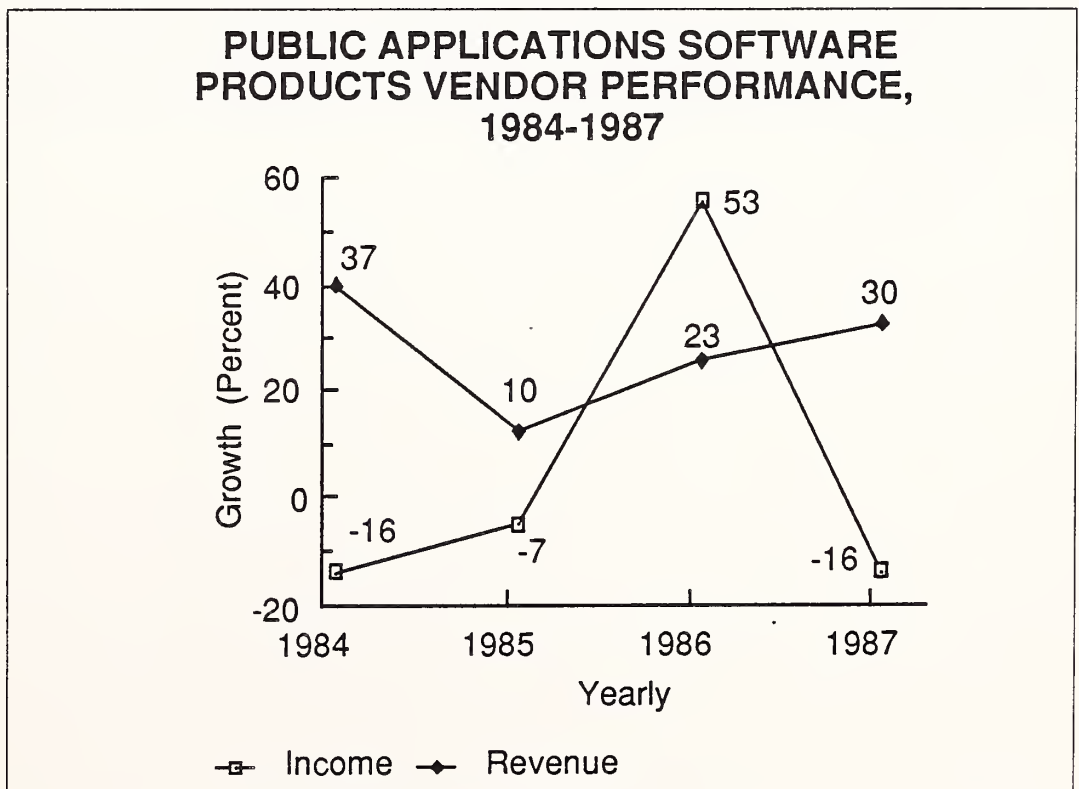


EXHIBIT VII-17

REVENUES OF PUBLIC APPLICATION SOFTWARE PRODUCTS COMPANIES

COMPANY NAME	FISCAL YEAR END	REVENUE (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	% (+/-)	QUARTRS	QUARTRS
AMERICAN S/W	04-30	10336	10005	10819	13087	44247	12817	11214	13481	15150	52662	19	17	20
AUTOODESK	01-31	11027	12172	13651	15531	52381	17292	18779	20208	22978	79257	51	50	48
COMSHARE	06-30	16920	16894	16808	17389	68011	17402	18584	17330	21681	74997	10	13	14
CYBERTEK	03-31	7387	6544	6407	6517	26855	6407	5151	5868	5406	22832	-15	-16	-13
ECAD	12-31	3763	4257	4006	4565	16591	4944	5744	6107	7105	23900	44	48	54
GENESEE	05-31	262	284	253	354	1153	249	240	195	300	984	-15	-18	-18
* HEALTH INFO.	06-30	666	333	679	776	2454	676	566	577	700	2519	3	3	-12
HOGAN SYSTEMS	03-31	7177	12132	10761	10919	40989	13380	11386	10366	12097	47229	15	0	4
INFO. SCIENCE	04-30	4666	3562	4167	3779	16174	3701	3159	2834	2750	12444	-23	-24	-30
INNOVATIVE	06-30	3622	4419	3442	3593	15076	5871 ¹	5963	6293	8727	26854	78	83	114
LOTUS DEVEL.	12-31	69270	66195	65560	81839	282864	84788	93973 ²	101199	115635	395595	40	46	47
MACNEAL-SCHWEND.	01-31	6216	6517	6980	7365	27078	7833	8461	8579	9657	34530	28	28	27
HSA	12-31	29421	47572	38764	77692 ³	193449	53412	82628	56754	65749	258543	34	25	5
MICROPRO INTL	08-31	10500	6898	10484	8372	36254	9241	11400	12326	10278	43245	19	32	20
POLICY MGMT	12-31	32033	35225	39739	43558	150555	41503	43600	46207	48772	180082 ⁴	20	17	14
SCIENTIFIC S/W	12-31	7565	6413	5774	8505	28257	6502	6731	5799	8540	27572	-2	2	0
SILVAR-LISCO	04-30	6240	5923	6300	6082	24545	7680	5206	6095	6186	25167	3	-4	-1
SOFTWARE PUB.	09-30	5684	4606	6429	8710	25429	10854 ⁵	8320	10700	14000	43874	73	67	63
S/W SVC AMER.	05-31	646	424	475	781	2326	1214	1755	2916	1312	7197	209	256	237
STOCKHLDR SYS.	03-31	3375	2403	3411	3349	12538	4814	4061	4955	5211	19041	52	55	50
SYSTEM SOFT.	10-31	3903	3470	5275	5010	17658	6364	8550	11016	11533	37463 ⁶	112	126	119
TIMBERLINE S/W	12-31	2142	1606	1348	2104	7200	1936	1876	1761	2082	7653	6	13	11
TOTALS		262821	257854	261532	329877	1092084	318880	357345	351566	395849	1423640	30	30	26

* INPUT ESTIMATE

EXHIBIT VII-18

NET INCOME OF PUBLIC APPLICATION SOFTWARE PRODUCTS COMPANIES

COMPANY NAME	FISCAL YEAR END	NET AFTER TAX INCOME (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
AMERICAN S/W	04-30	1830	1690	2146	2903	8569	2065	1292	2471	3900	9728	14	14	26
AUTODESK	01-31	2428	2714	3018	3461	11621	3880	4816	5436	6410	20542	77	81	83
COMSHARE	06-30	-229	130	503	656	1060	444	605	-946 ⁷	1431	1534	45	-15	-58
CYBERTEK	03-31	905	609	416	456	2386	315	-284	181	283	495	-79	-88	-47
ECAD	12-31	269	541	269	417	1496	343	788	903	1130	3164	111	130	196
GENESEE	05-31	25	29	16	27	97	8	37	5	25	75	-23	-7	-30
* HEALTH INFO.	06-30	-2907	-3614	-442	-367	-7330	-485	-1323	-515	-500	-2823	51	47	-25
HOGAN SYSTEMS	03-31	-4233 ⁸	1117	1960	2939	1783	3682 ³	1918	-2307	1864	4657	161	-84	-119
INFO. SCIENCE	04-30	-2827	-2569	-3169	-268	-8833 ¹⁰	-522	-857	-2747	-586	-4712	47	30	3
INNOVATIVE	06-30	719	803	439	192	2153	1345	693	813	517	3368	56	41	111
LOTUS DEVEL.	12-31	11371	11820	9528	15581	48300	13707	16281	19130	22925	72043	49	58	67
MACNEAL-SCHWEND.	01-31	1667	1627	1823	1888	7005	1955	2235	2390	2489 ¹¹	9069	29	33	31
MSA	12-31	-410	5937	260	12954 ¹²	18741	-72557 ¹³	18713	-8382	-8733	-70959	-479	-92	-230
MICROPRO INTL	08-31	900	-2409 ¹⁴	-342	26	-1825	548	1551	781	9	2889	258	186	350
POLICY MGMT	12-31	3063	3190	3580	3927	13760	3902	4016	4435	4745	17098	24	23	22
SCIENTIFIC S/W	12-31	23	-13272 ¹⁵	133	-739 ¹⁸	-13855	67	154	34	274	529	104	103	151
SILVAR-LISCO	04-30	255	64	12	-217	114	385	-4758 ¹⁷	-814 ¹⁸	125	-5062	-4540	-3763	-236
SOFTWARE PUB.	09-30	365	-737 ¹⁹	454	1236	1318	1584 ²⁰	881	1492	2500	6457	390	411	136
S/W SVC AMER.	05-31	-67	-603	109	326	-235	163	42	85	215	505	315	304	-31
STOCKHLDR SYS.	03-31	729	234	708	576	2247	822	469	1003	870	3164	41	54	46
SYSTEM SOFT.	10-31	393	325	680	507	1905	693	1020	1081	1071	3865	103	110	81
TIMBERLINE S/W	12-31	-66	-124	-218	256	-152	65	36	103	209	413	372	505	721
TOTALS		14203	7502	21883	46737	90325	-37591	48325	24132	41173	76039	-16	49	-5

* INPUT ESTIMATE

22 COMPANIES

Application Software Products Footnotes

1. Innovative Software's revenue gain was attributed to the release of the network-ready version of Smart. During this quarter, NCR placed a major order for SmartWare products.
2. Lotus' improved revenue in recent quarters has been due to success with new products such as Lotus HAL, Lotus Manuscript, Freelance Plus, and One Source, in addition to strong sales of core spreadsheet products.
3. MSA's revenues reflect its acquisition of Comserv.
4. Policy Management Systems' results include several acquisitions including Allied Research, Oregon and Consolidated Insurance Services, Aavant Health Management Group, Jensen and More, and Nationwide Computer Services.
5. Software Publishing's improved revenue reflects market acceptance of the company's new product.
6. System Software Associates' results include the acquisitions of Syncrocom Inc., ASE Services Inc., Outlook Inc., and Admin EDP PTY Ltd. (Australia).
7. Comshare's loss was attributed to lower-than-expected sales by the company's European subsidiary, Comshare Ltd.
8. Hogan Systems' loss resulted from lower-than-expected revenues combined with \$2.3 million in costs associated with the disposition of the New York office due to the closing last year of the International Systems Division.
9. Hogan Systems' results were attributed to increases in all revenue categories, coupled with cost control measures implemented during the year. In addition, Hogan acquired Systems 4, Inc.
10. Information Science's loss in 1986 resulted from decreased revenue from integrated payroll/personnel/benefits software due to the tax reform announcement and from increased operating reserves and revalued capitalized software. The loss for the quarter ended October 1986 included a \$1.1 million provision for restructuring costs.
11. MacNeal-Schwendler acquired A.O. Smith's subsidiary, CAD COMP.
12. MSA generates approximately 40% of revenue and essentially all of its income during the fourth quarter.

13. MSA's 1987 results were due to a change in accounting methods used, including a change in revenue recognition.
14. Micropro's loss was due to increased uncollectible receivables resulting from First Software's Chapter 11 filing.
15. Scientific Software's loss included net charges of \$13 million for the write-down of assets and a provision for losses on accounts receivable.
16. Scientific Software's loss included an \$848,000 charge representing the termination of a lease obligation.
17. Silvar-Lisco's results were restated to reflect a change in revenue recognition methods and include the cumulative effect on prior years.
18. Silvar-Lisco's loss included a charge of \$850,000 for the disposal of certain computer equipment and capitalized purchased software.
19. Software Publishing attributed \$500,000 of the loss to First Software, a major customer that filed for bankruptcy during the quarter. The remaining losses were due to investments in new product development and to a severe sales decline.
20. Software Publishing's increased net income during the past two quarters was due to improved sales of all products, especially the new products Pfs:First Publisher and Pfs:First Choice, and the revised version of Harvard Graphics.

Systems Software:

In 1987, public companies in the systems software products sector showed an average annual revenue growth rate of 56%, which was the highest revenue growth of all information services segments in that years. Growth in 1986 was 44%. See Exhibits VII-19 and VII-20.

As shown in Exhibit VII-21, net income for the public systems software sector grew 66% in 1987 compared to 48% in 1986.

The many contributors to both revenue and income growth in 1987 included Adobe Systems, Ashton-Tate, Computer Associates, Cullinnet, Duquesne Systems, Informix, Microsoft, Oracle and Pansophic.

Although several companies experienced losses at some point during 1987, earnings growth for this group over the past few years has been

accelerating. Earnings growth rates were 37%, 48%, and 67% in 1985, 1986, and 1987, respectively.

The group's profitability for 1987 was approximately 12%. The most profitable companies of the group were Adobe Systems (23%), Duquesne Systems (22%) and Microsoft (20%).

In 1987, Sterling Software was moved to the government professional services group to reflect the changes in its revenue distribution.

For more specific information on some of the more successful public software companies and their products, markets and strategies, see Chapter IV of this report.

EXHIBIT VII-19

PUBLIC SYSTEMS SOFTWARE PRODUCTS VENDOR PERFORMANCE, 1984-1987

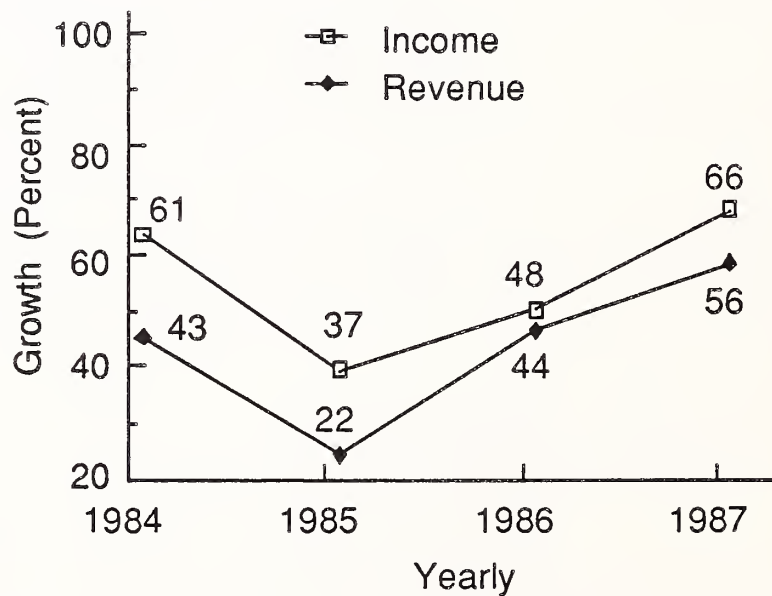


EXHIBIT VII-20

REVENUES OF PUBLIC SYSTEMS SOFTWARE PRODUCTS COMPANIES

COMPANY NAME	FISCAL YEAR END	REVENUE (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
ADOBE SYSTEMS	11-30	2392	3498	4932	5200	16022	6901	8682	9872	12308	37763	136	126	119
ASHTON TATE	01-31	41171	48989	57741	62900	210801	60211	63575	68034	75508	267328	27	22	19
AUTOMATED LAN.	12-31	1041	923	882	1511	4357	1131	851	762	782	3526	-19	-28	-35
* BGS SYSTEMS	01-31	3325	3465	2907	2885	12582	3111	3656	3380	3500	13647	8	14	19
BOOLE & BABBAGE	09-30	8612	8705	9365	9259	35941	9964	10345	12140	12307	44756	25	27	31
COGNOS	02-28	12998	15478	17629	16583	62688	18743	19500	18400	18022	74665	19	13	6
COMPUTER ASSOC.	03-31	57680	82775	96087	93618 ¹	330160	102047	139307	168286	195075	604715 ²	83	84	92
CULLINET	04-30	54221	31289	34236	43018	162764	61056 ³	49022	49104	54218	213400	31	40	34
DUQUESNE SYS.	09-30	5390	7374	7432	8635	28831	9766	9076	10178	12007	41027	42	33	38
INFODATA SYS.	12-31	2623	2233	2759	3616	11231	3155	2540	2837	2982	11514	3	-3	-9
INFORMIX S/W	12-31	4152	4617	5693	6646	21108	7149	9123 ⁴	11389	13956	41617	97	103	105
INTELLICORP	06-30	5412	5445	4084	4932	19873	5546	5790	5059	4950	21345	7	9	11
MICROSOFT	06-30	50505	61959	66780	80985	260229	98400	99762	102636	155896	456694	75	71	75
MORINO ASSOC.	06-30	6628	5910	6900	9286	28724	9081	7962	9238	12526	38807	35	35	34
ON-LINE S/W	05-31	8769	11250	9661	12704	42384	19819 ⁵	21432	18535	16890	76676	81	69	58
ORACLE	05-31	16031	20835	17611	28352	82829	34911	50397 ⁶	41274	60306	186888	126	128	121
PANSOPHIC	04-30	22500	20117	24312	34607 ⁷	101536	34900	33647	37408	48608	154563	52	51	46
SAGE SOFTWARE	04-30	3651	2964	3402	3825	13842	4312	2807	3358	4101	14578	5	1	3
SOFTWARE AG	05-31	14642	18727	15397	17087	65853	15274	19486	17190	18678	70628	7	8	10
SYNERCOM TECH.	10-31	5140	3694	3881	1441	14156	2463	2905	3469	4128	12965	-8	16	43
VM SOFTWARE	12-31	4313	6249	6038	10426 ⁸	27026	6296	6787	6038	11499	30620	13	7	7
TOTALS		331196	366496	397729	457516	1552937	514236	566652	598587	738247	2417722	56	56	56

* INPUT ESTIMATE

EXHIBIT VII-21

NET INCOME OF PUBLIC SYSTEMS SOFTWARE PRODUCTS COMPANIES

COMPANY NAME	FISCAL YEAR END	NET AFTER TAX INCOME (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
ADOBE SYSTEMS	11-30	550	868	1168	980	3566	1584	1988	2289	2715	8576	140	132	133
ASHTON TATE	01-31	5124	6471	7935	10600	30130	9098	10136	11087	12755	43076	43	36	29
AUTOMATED LAN.	12-31	170	51	-84	351	488	181	-1123 ⁹	-1436	-4703	-7081	-1551	-2384	-2399
* BGS SYSTEMS	01-31	402	221	28	-243	408	-43	174	174	200	505	24	9033	274
BOOLE & BABBAGE	09-30	297	236	328	410	1271	490	532	626	3942	5590	340	424	519
COGNOS	02-28	809	1886	1882	1413	5990	2449	1500	1150	1785	6884	15	-14	-11
COMPUTER ASSOC.	03-31	5326	4393	6103	16351 ¹⁰	32173	11236	4104	15971	42783	74094	130	134	162
CULLINET	04-30	3632	-10612	-5914	-4949	-17843 ¹¹	-4116	7997	-5810	-12717 ¹²	-14646	18	51	-71
DUQUESNE SYS.	09-30	1122	1460	1487	1920	5989	2202	1822	2176	2707	8907	49	38	43
INFODATA SYS.	12-31	94	-356	268	376	382	268	50	214	577	1109	190	192	23
INFORMIX S/W	12-31	349	455	728	931	2463	804	1172	1918	2047	5941	141	143	139
INTELLICORP	06-30	609	3563	-850	-501	2821	69	-2705 ¹³	-649	-972	-4257	-251	-296	-20
MICROSOFT	06-30	10629	11507	15824	19697	57657	19100	17257	21259	35329	92945	61	57	59
MORINO ASSOC.	06-30	1454	587	1100	1988	5129	2264	844	1585	2971	7664	49	47	48
ON-LINE S/W	05-31	686	938	735	1018	3377	1487	1692	1020	1717	5916	75	65	56
ORACLE	05-31	2052	2586	127	3045	7810	4834	7617 ¹⁴	3161	7653	23265	198	220	241
PANSOPHIC	04-30	3764	2356	3644	6197	15961	4627	2644	4158	7702	19131	20	19	21
SAGE SOFTWARE	04-30	532	43	420	581	1576	724	242	264	575	1805	15	4	-16
SOFTWARE AG	05-31	1598	1933	1103	986	5620	194	2048	1296	608	4146	-26	-2	-9
SYNERCOM TECH.	10-31	1106	1448	-127	-1895	532	-1016	-506	-2209 ¹⁵	87	-3644	-785	-358	-5
VM SOFTWARE	12-31	642	966	845	2475 ¹⁶	4928	786	116	181	2327	3410	-31	-39	-24
TOTALS		40947	31000	36750	61731	170428	57222	57601	58425	110088	283336	66	75	71

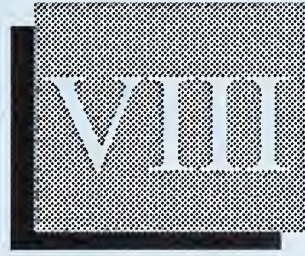
* INPUT ESTIMATE

21 COMPANIES

Systems Software Products Footnotes

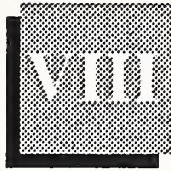
1. Computer Associates' revenue included results of the ISSCO and Software International acquisitions made during the fourth quarter.
2. Computer Associates' revenue included results of the UCCEL acquisition.
3. Cullinet's revenue reflects the 1987 business combination with Distribution Management Systems.
4. Informix Software's revenue growth reflects marketing agreements made with Foxboro Company, a leading Informix VAR; and Hewlett-Packard, a large Informix end user; as well as several DBMS and add-on product introductions, including Informix Turbo, Informix Datasheet Add-In and Report DB2.
5. On-Line Software's revenue reflected the products acquired from Martin Marietta in October 1986.
6. Oracle's improved revenue in the past two quarters reflects an increased number of installations as Oracle increased the number of computers and operating systems on which ORACLE operates. Some of the increase in revenue was due to unbundling of products.
7. Pansophic's increased revenue reflects the Professional Computer Resources and Remote Data Systems acquisitions, as well as an improvement in domestic operations, especially product and license revenue contributions by Telon, Easytrieve Plus, and Easytrieve Plus PC.
8. VM Software's increased revenues resulted from an increase in unit product licenses, the introduction of new products, new releases of existing products, general price increases, and revenues recorded under the marketing agreement with IBM.
9. Automated Language's losses reflected a decrease in computer systems sales, which reportedly resulted from management's decision to shift the focus in the translation market from that of a software provider to a full translation services provider. In addition, the loss included increased costs associated with advertising, the company's acquisition strategy, and relocation of headquarters.
10. See footnote 1.
11. Cullinet Software's first fiscal quarter loss included a \$7 million write-off of the remaining assets acquired from Computer Pictures. The company attributes its remaining losses to decreased revenues due to a sluggish mainframe market and increased competition.

12. Cullinet's loss during its third quarter fiscal 1988 included a \$13.7 million pretax charge for the write-down of outdated mainframe software purchased a year or more ago as well as the adjustment of accounts receivable and some notes reflecting restructured arrangements with overseas sales representatives.
13. Intellicorp's loss during its fourth fiscal quarter included write-offs of obsolete hardware inventory and costs associated with a reduction in staff.
14. Oracle's increased earnings during the previous quarters reflected significant gains in revenue, which the company attributes to the acceptance of SQL as an industry standard.
15. Synercom Technology's loss resulted from costs associated with the company's movement out of selling workstations, in addition to a major reorganization of management.
16. See footnote 8.



Turnkey Systems/VAR Sector Analysis





Turnkey Systems/VAR Sector Analysis

A

Turnkey Systems/ VAR Market, 1987

The turnkey systems/VAR market usually includes an integration of systems and applications software (packaged or custom), CPU equipment, and peripherals, all tailored for a specific set of user requirements. The value added by the turnkey systems/VAR is primarily in the software, either packaged or custom developed. Many CAD/CAM and small business systems are marketed as turnkey/VAR solutions.

Within the information services market, turnkey systems suppliers, VARs, and systems integrators represent a continuum of services provided, with many VARs and turnkey systems suppliers beginning to expand their services more into the systems integration area.

INPUT subdivides the total turnkey systems/VAR market into four submodes: equipment; packaged software; customized software; and other, including education, training, and professional services. The equipment submode is further divided into mainframes, minicomputers, and workstation/PCs.

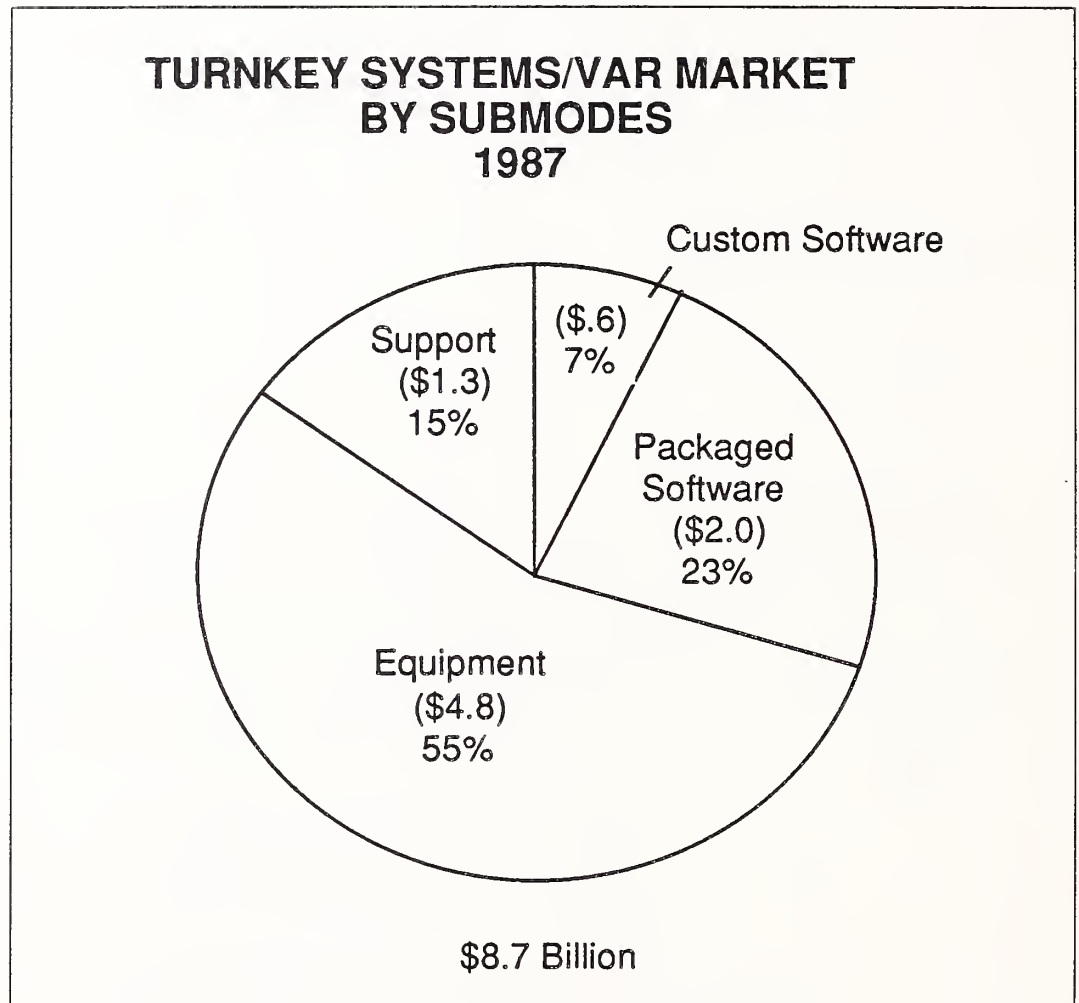
Market size information on turnkey systems/VAR industry sectors, including both vertical and cross-industry markets, is provided in a series of separate reports by INPUT, classified by the two-digit standard industrial classification (SIC) codes of the federal government.

The growth rate of the total turnkey systems market in 1987 was 11%, with user expenditures in 1987 totaling \$8.7 billion, compared to \$7.8 billion in 1986. The turnkey systems/VAR market represented a 13% share of the total 1987 information services market, slightly less than the 14% share in 1986.

In 1987, as shown in Exhibit VIII-1, within the turnkey systems/VAR market, equipment sales were \$4.8 billion; packaged software sales

totaled \$2.0 billion; customized software sales totaled \$0.6 billion; and the education, training, and professional services portion totaled \$1.3 billion.

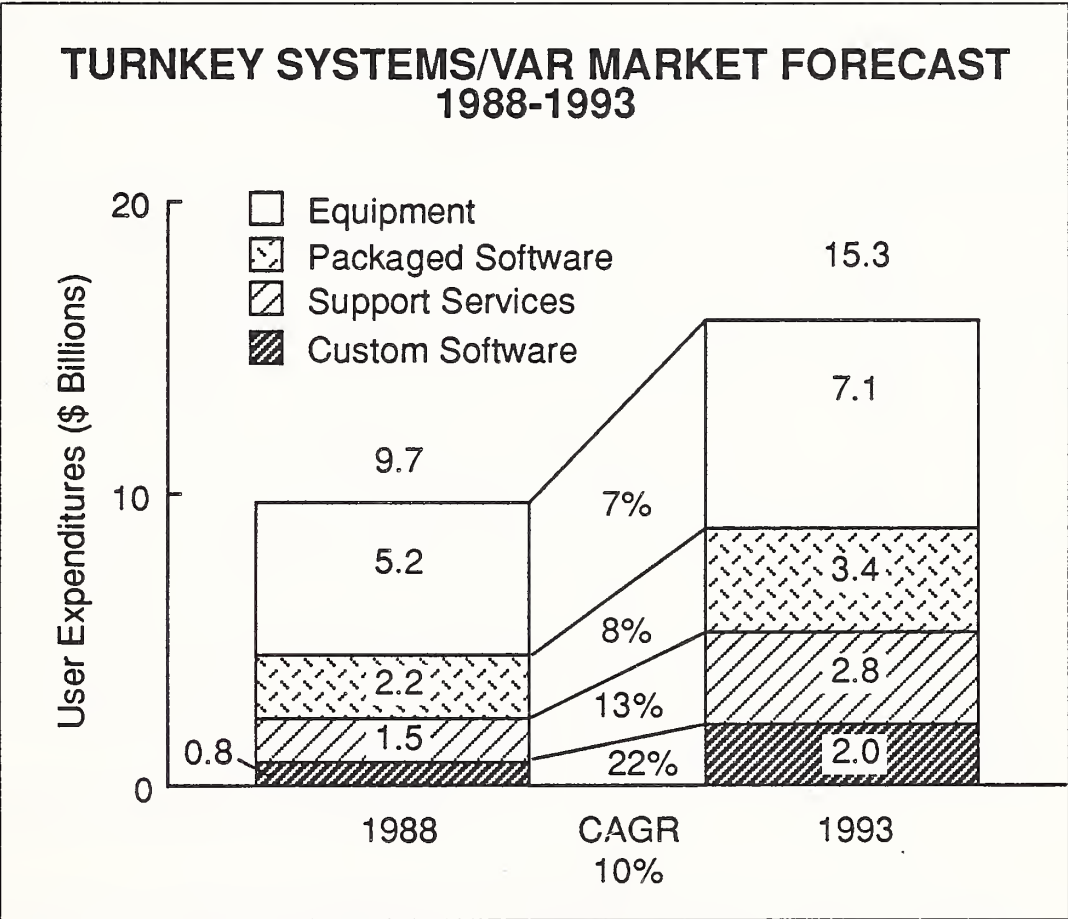
EXHIBIT VIII-1



Forecast:

As shown in Exhibit VIII-2, INPUT forecasts that the market for turnkey systems/VARs will increase from \$9.7 billion in 1988 to \$15.3 billion in 1993, for a CAGR of 10%. Increasing acceptance of PC-based turnkey systems solutions should help sustain the market growth.

EXHIBIT VIII-2



Driving forces that will positively impact growth in the turnkey systems/VAR markets, as shown in Exhibit VIII-3, include the following:

- **Micro-Based Solutions:** New micro-based solutions with sophisticated standard software are expanding the market potential for turnkey systems/VAR suppliers in the smaller business environment.
- **Customization:** A major opportunity exists for VARs for software customization for smaller- to medium-sized businesses, with the larger independent software companies and computer systems vendors stressing more of a standard product strategy.
- **Growth of Support Services:** Many turnkey systems suppliers/VARs can grow faster and provide a more-stable revenue base by expanding into related product support services.
- **Software Applications Required:** There is an increasing need for software applications for industry-specific solutions as opposed to the more general, generic applications that have constituted the first wave of computer systems applications purchases.
- **Account Control at Low End of Spectrum:** Computer systems vendors are courting turnkey systems suppliers/VARs to market their lower-

priced computer systems to address a customer base that cannot be profitably addressed through the computer systems vendors' direct sales force.

EXHIBIT VIII-3

**TURNKEY SYSTEMS MARKET—
DRIVING FORCES**

- Micro-Based Solutions
- Customization
- Growth of Support Services
- Software Applications Required
- Account Control at Low End of Spectrum

Inhibiting forces that will continue to negatively impact growth in the turnkey systems market are listed in Exhibit VIII-4 and include:

- **Shift to Software Vendor Role:** Turnkey systems suppliers/VARs are having to achieve more of their revenue growth and profitability from software sales; whereas, historically much of the revenue growth and a major source of profitability was derived from hardware. This change-over will likely cause a further shakeout in the market as many companies find they don't have the resources to compete in a software market requiring high levels of research and development expenditures.
- **Hardware Vendors Writing Software:** Turnkey systems/VAR vendors are becoming more competitive with their reseller client base with an increasing emphasis on combined computer systems/applications software sales. This situation is making channel conflict a major issue in the turnkey systems supplier/VAR market.
- **Cash Flow/Prime Contractor Expenses and Resources:** The cost of being a prime contractor, and the cash flow required to purchase hardware and then re-sell it, are limiting the ability of small vendors to expand.

EXHIBIT VIII-4

**TURNKEY SYSTEMS MARKET—
INHIBITING FORCES**

- Shift to Software Vendor Role
- Hardware Vendors Writing Software
- Cash Flow/Prime Contractor Expenses and Resources

B**Turnkey Systems
Market Competitive
Analysis**

See Exhibit VIII-5 for market share information on the turnkey systems market, including private and public vendors. Revenue data represents only the turnkey systems revenue for each company. The revenue figures reflect INPUT's estimates where specific information is not available from the vendor.

The top 10 companies in the turnkey systems group are public. Schlumberger CAD/CAD and McDonnell Douglas Information Systems Group are publicly traded as part of their parent companies.

Section D of this chapter provides market share rankings on publicly owned companies (pure players) providing turnkey systems solutions.

EXHIBIT VIII-5

MAJOR VENDORS' SHARES OF TURNKEY SYSTEMS MARKET—1987

Company Name	1987 Revenue (\$ Millions)	Market Share (Percent)
Intergraph	628	7
Computervision/Prime	540	6
Schlumberger CAD/CAM	468	5
Reynolds & Reynolds Company (The)	230	3
McDonnell Douglas Infor- mation Systems Group	225	3
Compugraphic Corp.	220	3
National Computer Systems	210	2
Automatic Data Processing, Inc.	195	2
ISC Systems Corporation	145	2
Bolt, Beranek and Newman, Inc.	136	2
Convergent Tech.	130	2

C

Turnkey Systems/ VAR Market and Trends

The turnkey systems market in 1987 continued to reflect the slowest growth rate of all the principal delivery modes of the information services group. In addition, the individual companies within this delivery mode continue to reflect sharply divergent relative performance.

Factors contributing to these trends include:

- Hardware standardization has negatively impacted certain turnkey suppliers, particularly those in CAD/CAM/CAE that had achieved healthy profit margins in the early growth stages of these markets from proprietary hardware offerings. Those vendors that emphasized unique

software applications with standard hardware and systems software platforms have tended to fare the best both in terms of revenue growth and in profitability. With the rapid obsolescence of personal computer/workstation platforms, in particular, it has proven very difficult for providers of proprietary hardware platforms to maintain competitive performance levels.

- The provision of total solutions for several of the vertical markets by the major computer systems vendors such as IBM and DEC has created significant new competition for turnkey/VAR systems vendors. These include DEC's Solution Systems; IBM's SolutionPacs (general cross-industry office systems solutions, as well as products for financial accounting, design and drafting, doctor's office management, the legal profession and the construction industry); and the recent introduction of IBM's AS/400 with bundled data base management, communications, and applications software solutions for several of the vertical markets.
- More recently, systems integration vendors have also been taking market share from turnkey suppliers by providing a broad solution based on an emphasis on related professional services such as consulting, education, and training. This is putting increasing pressure on turnkey systems vendors to also expand the services and customization portions of their business and in effect move more in the direction of systems integration.
- Certain turnkey systems vendors in highly specialized vertical markets have sometimes failed to realize the limited size of the potential market for certain vertical subsegments and achieved a high percentage of market penetration without creating new products to sustain historical growth rates.
- One formula for sustaining revenue growth rates among turnkey systems suppliers has been to diversify market outlets as well as expand support services. Interleaf, in the electronic publishing cross-industry turnkey market, has more recently announced several OEM and other third-party relationships outlets for its software. In addition, Interleaf continues to expand the market potential for its Technical Publishing Software by porting the software to the Macintosh II product line.
- INPUT also projects that the federal government market for turnkey systems will show relatively strong growth as agencies opt for packaged systems approaches.

D

Public Turnkey Systems Company Revenue and Net Income Performance

Revenue for the public turnkey systems group grew 7%, 10%, and 15% respectively in 1985, 1986, and 1987. As shown in Exhibit VIII-6, net income fell 96% in 1985, jumped 376% in 1986, and grew 74% in 1987.

However, performance for the individual companies tracked in the INPUT index of public turnkey systems has varied considerably, both on a relative basis and for the individual companies on year-to-year comparisons, as shown in Exhibit VIII-7.

Many companies, such as ASK Computer Systems, C3, Computer Consoles, Computervision, Gerber Scientific, Intergraph, and Reynolds and Reynolds have grown significantly in terms of revenues. These are companies providing management information systems and CAD/CAM/CAE systems for manufacturing, government, telecommunications, architecture, engineering, construction, and service-oriented organizations such as hospitals and accounting firms.

Not all of these companies, however, have performed consistently in terms of earnings. For example, Computer Consoles and Computervision each sustained significant losses for 1985 and moderate losses for 1986. In addition, many other turnkey systems companies have experienced slow growth and erratic earnings, as seen in Exhibit VIII-8.

Profitability for the group in 1986 was 6%.

See Chapter IV, section C for more information on successful public turnkey systems companies.

EXHIBIT VIII-6

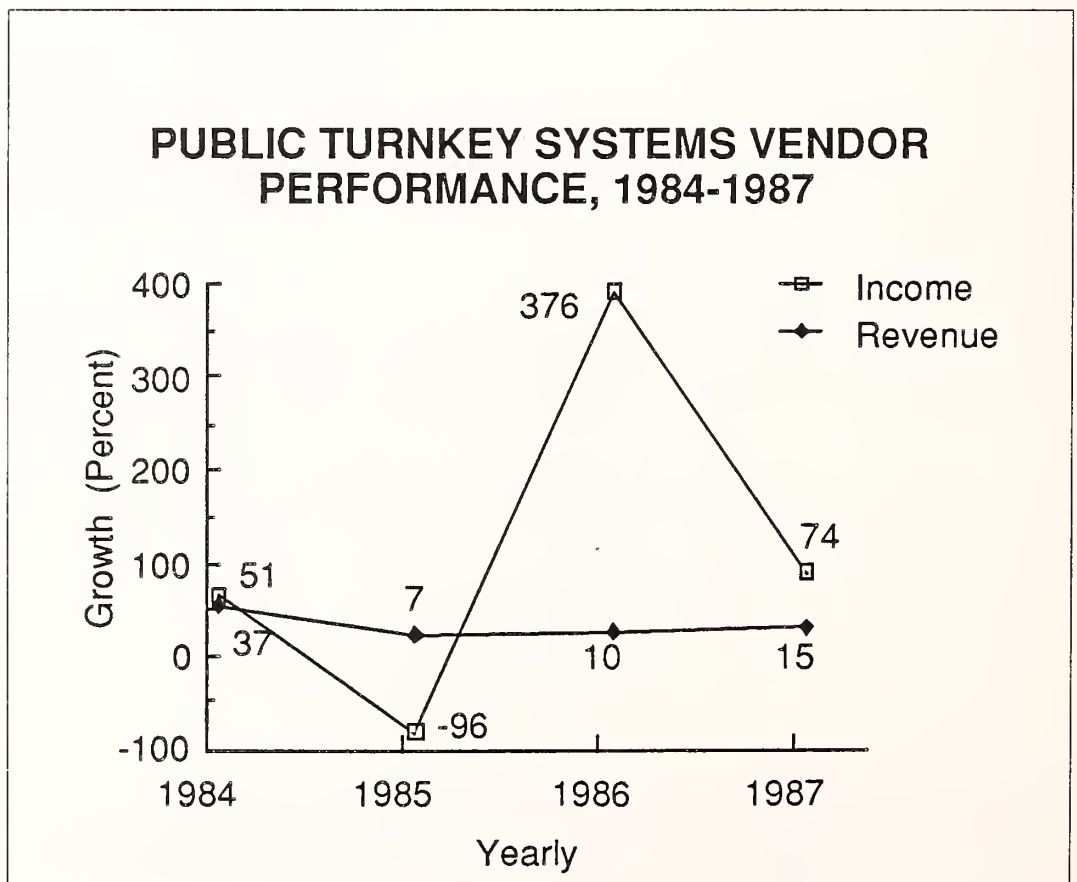


EXHIBIT VIII-7

REVENUES OF PUBLIC TURNKEY SYSTEMS COMPANIES

COMPANY NAME	FISCAL YEAR END	REVENUE (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
ASK COMPTON SYS	06-30	17601	26587	20344	21159	85691	25400	31400	26609	32346	115755	35	33	42
AUTO-TROL TECH	12-31	15595	14860	15400	16494	62349	17961	17963	17840	22209	75973	22	24	26
AVANT-GARDE	04-30	4005	4449	4629	4986	18069	3295	5568	4690	3840	17393	-4	0	-11
BARRISTER INFO	03-31	10877	5563	8152	8583	33175	10971	8262	9284	9250	37767	14	20	11
C3	03-31	11700	14700	21420	25297	73117	24900	24463	24310	35257	108930	49	37	28
CERNER	12-31	794	3994	5390	7178	17356	5566	7259	8467	12303	33595	94	69	65
COMPTON RESEARCH	03-31	7825	7151	7952	9219	32147	10131	10055	10542	12839	43567	36	37	36
COMPTON CONSOLES	12-31	21184	33085	34009	41279 ¹	129557	35572	35810	37810	39202	148394	15	4	2
COMPTON DESIGN	08-31	940	846	894	694	3374	746	998	974	536	3254	-4	3	-5
COMPUTERVISION	12-31	112918	119339	125920	136495	494672	139818	136541	132295	155374	564028	14	11	10
COMPUTRAC	01-31	2335	2723	2747	1980	9785	1950	2207	1611	1631	7399	-24	-27	-31
DAISY SYSTEMS	09-30	22488	23089	24999	25380	95956	23829	24066	27585	28048	103528	8	8	10
GERBER SCI.	04-30	48936	54405	56314	53351	213006	59784	61786	64428	68834	254832	20	19	22
HBO	12-31	41198	37567	35962	40095	154822	37406	43733	44957	49134	175230	13	21	24
INTERGRAPH	12-31	147016	150371	150967	157383	605737	128478 ²	160196	157087	195322	641083	6	12	14
INTERLEAF	03-31	6840	6405	8578	10405	32228	11785	10533	12732	17006	52056	62	59	57
ISC SYSTEMS	06-30	41000	46360	40223	34797 ³	162380	43617	49895	44122	41799	179433	11	12	15
LIBRA SYSTEMS	10-31	1259	1246	1281	1071	4857	1017	788	954	582	3341	-31	-35	-35
PENTA SYSTEMS	12-31	5849	5191	5475	5059	21574	4355	5174	6526	5948	22003	2	12	18
REYNOLDS & R.	09-30	87662	102140	133649	128999	452450	141637	140400	151694	138402	572133	26	18	10
SYSTEMS INTEGRA.	09-30	16092	18029	19225	16070	69416	13601	13472	15659	15212	57944	-17	-17	-13
TENERA	12-31	6536	9247	9590	9900	35273	9800	9500	8536	8300	36136	2	-8	-14
TRIAD SYSTEMS	09-30	25600	26321	32045	27200	111166	26384	28446	35207	26569	116606	5	5	4
TOTALS		656250	713668	765165	783074	2918157	778003	828515	843919	919943	3370380	15	15	14

* INPUT ESTIMATE

EXHIBIT VIII-8

NET INCOME OF PUBLIC TURNKEY SYSTEMS COMPANIES

COMPANY NAME	FISCAL YEAR END	NET AFTER TAX INCOME (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING QUARTRS	LAST 2 ROLLING QUARTRS
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)		
ASK COMPTR SYS	06-30	1371	1985	1775	1995	7126	1681	2550	1882	2252	8365	17	16	10
AUTO-TROL TECH	12-31	-1603	-1778	-691	-2966	-7038	515	272	375	854	2016	129	128	134
AVANT-GARDE	04-30	-2313	-774	-895	-541	-4523	4217	87	149	-408	4045	189	92	82
BARRISTER INFO	03-31	1264	-574	16	302	1008	1220 ⁴	55	366	-75	1566	55	235	-8
C3	03-31	-327	518	4 ⁵	1681	1876	2000	2262	2519	7891	14672	682	475	518
CERNER	12-31	-805	728	926	1442	2291	654	708	1070	1594	4026	76	9	13
COMPTEx RESEARCH	03-31	82	124	201	283	690	373	285	373	382	1413	105	71	56
COMPTR CONSOLES	12-31	-5624	-886	1633	1894	-2983	833	885	612	8990	11320	479	297	172
COMPTR DESIGN	08-31	56	112	-80	20	108	10	345	8	-111	252	133	365	-72
COMPUTERVISION	12-31	-7006	-3404	1165	3471	-5774	5804	4128	1508	8040	19480	437	1010	106
COMPUTRAC	01-31	379	514	633	455	1981	154	455	-1020 ⁶	-9	-420	-121	-136	-195
DAISY SYSTEMS	09-30	-4705	-1828	-860	1293	-6100	-4904 ⁷	-10537 ⁸	458	1013	-13970	-129	-550	240
GERBER SCI.	04-30	4996	4689	4789	5226	19700	6353	6464	7471	7749	28037	42	47	52
HBO	12-31	746	-6256 ⁹	924	974	-3612	835	2386	3417	6683	13321	469	387	432
INTERGRAPH	12-31	18003	17343	15496	19520	70362	10011	16754	18381	24730	69876	-1	14	23
INTERLEAF	03-31	258	-1154	-251	353	-794	642	534	968	3009	5153	749	529	3799
ISC SYSTEMS	06-30	3700	4217	2809	29	10755	1114	2572	2223	2155	8064	-25	-1	54
LIBRA SYSTEMS	10-31	-406	634 ¹⁰	-331	7	-96	-155	-123	160	-384	-502	-423	-212	31
PENTA SYSTEMS	12-31	302	273	381	-344 ¹¹	612	-291	-1662 ¹²	440	106	-1407	-330	-460	1376
REYNOLDS & R.	09-30	5419	6512	7024	4494	23449	5042	5811	5874	2739	19466	-17	-20	-25
SYSTEMS INTEGRA.	09-30	2337	2782	3000	1917	10036	628	733	838	1598	3797	-62	-59	-50
TENERA	12-31	519	663	-1414 ¹³	1100	868	2200	2400	2216	2100	8916	927	1824	1675
TRIAD SYSTEMS	09-30	551	689	1538	833	3611	853	1190	3551	1346	6940	92	99	107
TOTALS		17194	25129	37792	43438	123553	39789	38554	53839	82244	214426	74	64	68

23 COMPANIES

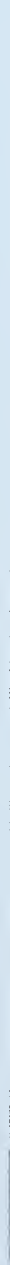
Turnkey Systems

1. Computer Consoles reported that sales to its customers in the communications systems industry contributed to improved fourth-quarter revenues, including the shipment of \$13 million of add-on directory assistance equipment for British Telecom.
2. Intergraph's shipments were down during the quarter, resulting in lower revenue and earnings due to a temporary shortage in the microprocessor used in the company's new workstation products.
3. ISC Systems reported that the reduced level of revenue for the quarter was the result of the rescheduling of installation dates for several major projects into the next quarter and reduced rates of add-on business to existing customers and distributors.
4. Barrister Information Systems recognizes higher revenue and most of its profits during the last quarter of its fiscal year.
5. C3's earnings reflected a charge of \$7.6 million resulting from a contract settlement and a \$3.7 million pretax gain on the sale of land.
6. CompuTrac's results included a \$1.1 million capital loss attributable to the disposal of the company's equity investments.
7. Daisy Systems' losses have been attributed to a weak capital spending environment combined with delayed shipments, product transition, and severance payments resulting from layoffs.
8. Daisy Systems' loss included pretax charges of \$5.1 million to cover fixed-asset and inventory write-downs associated with the introduction of the company's new product line and provisions for severance and other employee benefits related to staffing changes.
9. HBO's loss in second quarter 1986 reflected \$9.4 million in write-offs due to (1) internal reorganization, (2) dissolution of its holding company, (3) a write-off of capitalized software, and (4) write-downs of computer hardware to market value.
10. Libra Systems (formerly National Data Communications) formed a new company through a joint venture agreement. The extraordinary gain resulted from the difference between the market and book values of the preferred stock exchanged in the agreement.
11. Penta Systems' loss was primarily due to a write-off for obsolete inventory.

12. Penta Systems' loss included a \$600,000 bad-debt charge related to a Harper & Row sale; \$400,000 in reserve set up for previous recourse sales agreements; and \$200,000 in inventory write-downs.
13. Tenera's results included a \$2.3 million loss from discontinued wind energy operations.



Systems Integration Sector Analysis





Systems Integration Sector Analysis

A

Systems Integration Market, 1987

INPUT defines systems integration as the delivery of large, multidisciplinary, multivendor systems, incorporating some or all of such functions as systems design, programming, integration, equipment, networks, installation, and acceptance. Systems also can encompass multiple product delivery modes.

In 1987, INPUT separated the systems integration delivery mode from professional services. This move was in recognition of the fact that the information services market has become increasingly multivendor-oriented and that systems integration, which focuses on multivendor installations, is in an initial high-growth phase of a potentially major information services sector.

INPUT divides the total systems integration market into the following submodes: equipment, packaged software, customized software, and professional services (for systems integration only).

The systems integration market in 1987 was \$3.8 billion compared to \$2.7 billion in 1986, reflecting a 40% annual growth rate, the highest in the information services market.

In 1987, the systems integration market represented 5% of the total information services market.

Market size information on vertical-industry and cross-industry markets is provided by INPUT in a series of separate reports classified by two-digit groups of the standard industrial classification (SIC) codes of the federal government.

Forecast:

INPUT forecasts that the market for systems integration will increase from \$4.8 billion in 1988 to \$14.6 billion in 1993, for a CAGR of 25%. As shown in Exhibit X-1, the federal portion of this market is expected to grow from \$2.5 billion in 1988 to \$5.7 billion in 1993, for a CAGR of 18%. The commercial systems integration market is expected to grow from \$2.3 billion to \$8.9 billion in 1988, for a CAGR of 31%. The growth discrepancy between these two market divisions is due primarily to anticipated federal government budgetary constraints over the next several years related in particular to the Gramm-Rudman legislation. However, even within this context, systems integration is anticipated to be the hottest federal information services market over the next five years. This is due to the need to tie divergent systems together as a means of avoiding system redundancy and incompatibility, as well as to upgrade obsolete information systems.

EXHIBIT IX-1

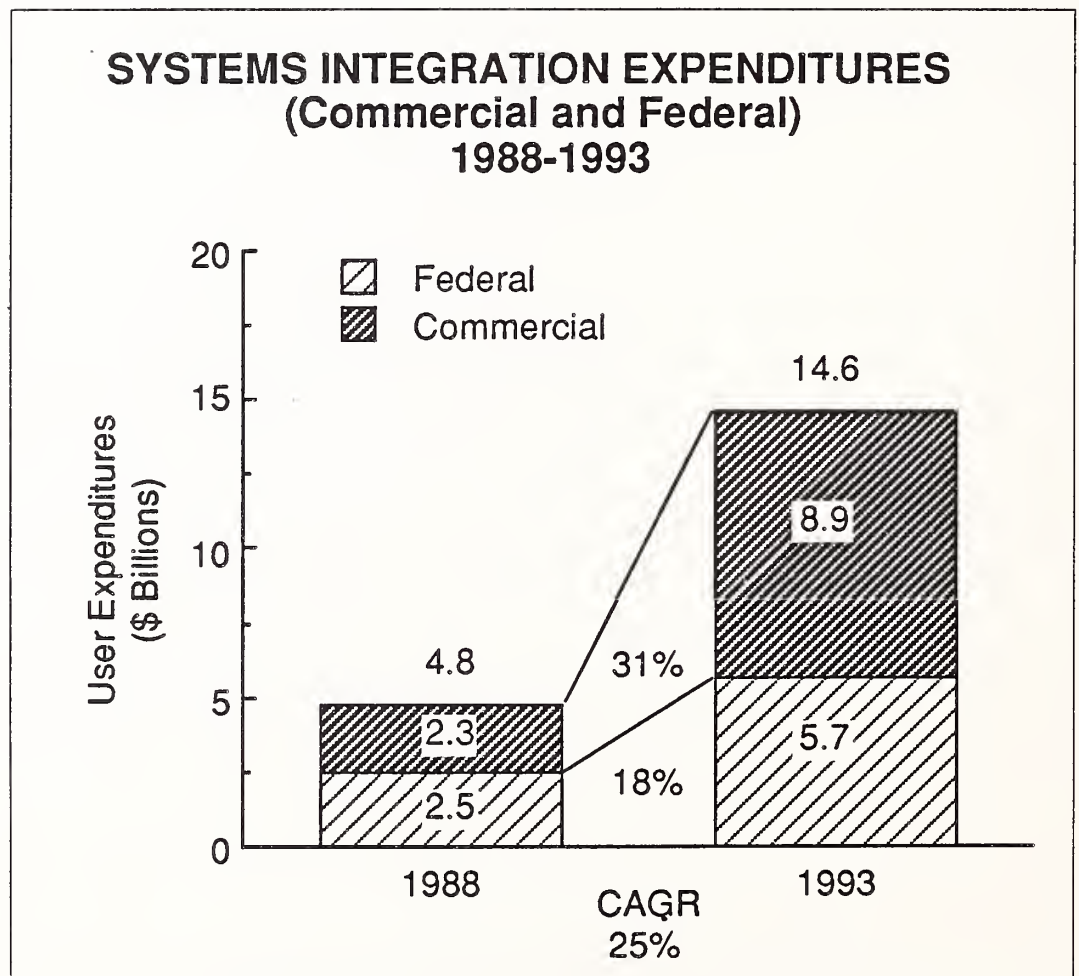
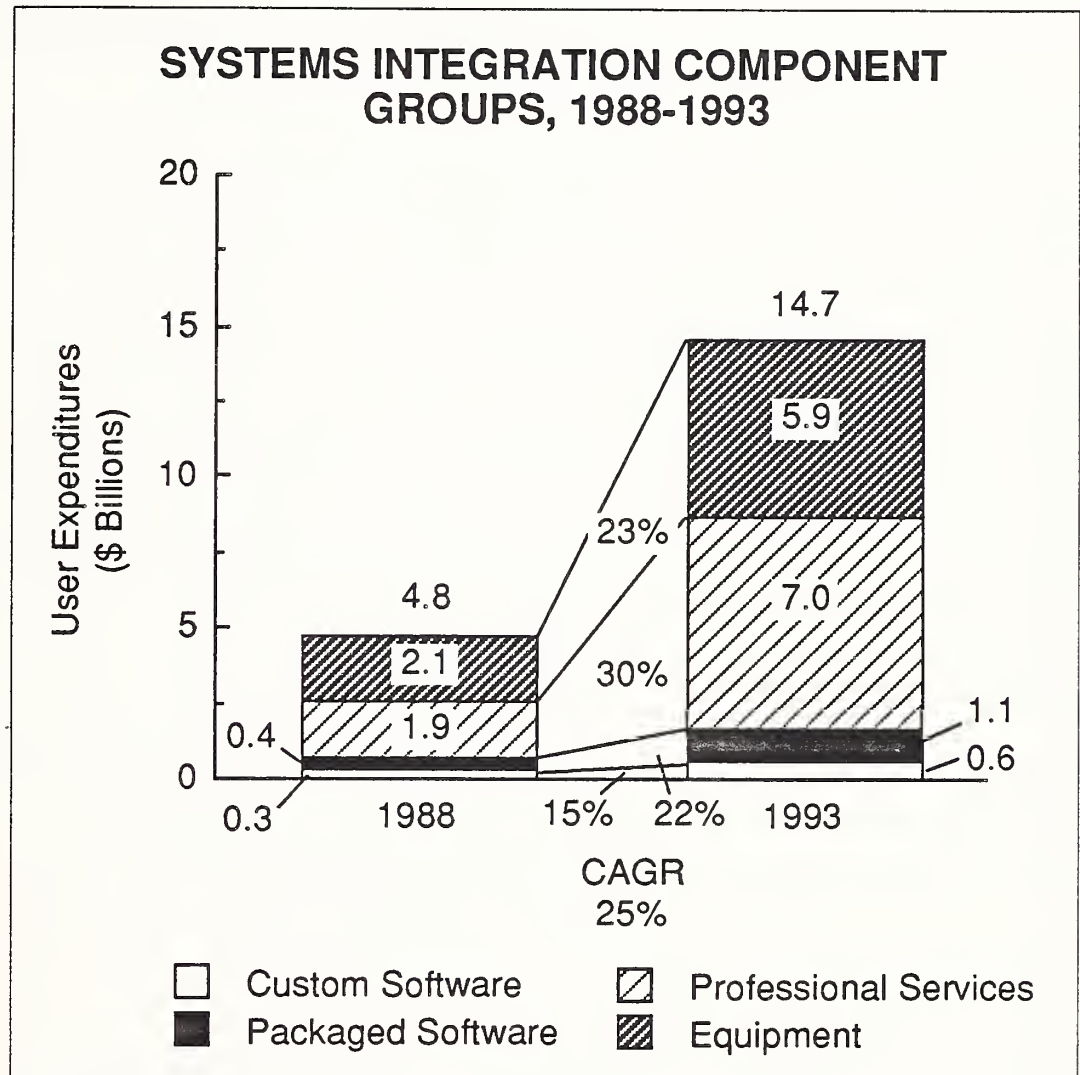


Exhibit IX-2 shows INPUT's forecast for the particular market components of the total (commercial and federal) systems integration market over the next five years.

EXHIBIT IX-2



Driving forces positively impacting the systems integration market include:

- **Systems Complexity/Networking Requirements:** Many users do not have the internal IS resources to install more-complex computer systems involving wide-area networking and multi-vendor equipment.
- **Alliance Formation:** Increasing use of alliances among larger companies, which take the risk of the MIS manager as the prime contractor, is allowing many smaller companies to enter the systems integration market as lower-risk subcontractors.
- **Shift from Professional Services:** Many contracts that formerly might have called for a professional services vendors are now being defined as systems integration projects, which is shifting user dollars into the system integration delivery mode.
- **Aggressive Entry by Large Vendors:** Many of the larger computer systems vendors, such as IBM, DEC, HP, and Apple have announced

systems integration divisions accompanied by aggressive actions to penetrate and secure a presence in the systems integration market.

- **Shift of Vendor Attention from Government to Commercial Sector:** The proven success of the systems integration contract approach in the federal government is fueling a high level of interest in this delivery mode by the larger commercial users.

Inhibiting forces that will negatively impact the systems integration market including:

- **Deep Pockets Required of Vendors:** The large financial risks and cash resources needed by prime contractors for many systems integration contractors limits the prime contractor market to a few large players, which could eventually lead to an industry oligopoly and capacity restraints.
- **Financial Risk to Vendors:** In this relatively new market, there have been a number of recent revenue revisions, particularly by the smaller systems integration vendors, related to contract write-offs from inexperience in the contract bidding process.
- **Lack of Proven Successes:** It is too early in the development cycle to determine ultimate financial returns on this delivery mode. However, at present, it looks like a delivery trend that will succeed.

B

Systems Integration Market Competitive Analysis

See Exhibit IX-3 for market share information on the total systems integration market, including both private and public vendors. Revenue data represent only the systems integration revenue for each company. The revenue figures reflect INPUT's estimates where specific information is not available from the vendor.

EXHIBIT IX-3

MAJOR VENDORS' SHARES OF SYSTEMS INTEGRATION MARKET—1987

Company Name	1987 Revenue (\$ Millions)	Market Share (Percent)
IBM Corporation	484	14
EDS Corporation	454	13
Arthur Andersen & Co.	315	9
CSC Corporation	167	5
SHL Systemhouse, Inc.	114	3
Unisys Corporation	98	3
Grumman Data Systems Division	96	3
Control Data Corporation	84	3
AGS Computers, Inc.	74	2
Science Applications International	72	2

C

Systems Integration Market and Trends

The significant perceived potential in this relatively new market is attracting major vendors from a number of different markets. Most of the major computer systems vendors are establishing new systems integration groups. In particular, IBM and Apple Computer have recently established separate new divisions to aggressively address this market. Other more nontraditional entrants include RBOCs, management consulting firms, and software product producers.

Network Integration:

The potential market for systems integrators has been significantly enhanced within the past two years by the accelerating demand for network integration solutions, which usually include software and hardware components from multivendor sources.

Systems integration-type solutions are being further enhanced by the development of new programming tools and communications gateways and interfaces that promote the transparent access to data and applications across disparate hardware and software platforms.

Network integration involves basically two overlapping segments:

- The first type involves the development of single, integrated networks to transmit a combination of voice, data, and graphics and image information between multiple sites of an enterprise or among sites of different enterprises.
 - The market for this type of network integration is growing rapidly, particularly within Fortune 500 companies. INPUT is estimating the market for the integration of voice, data, graphics, and video products and services will grow from about \$2.2 billion in 1987 to \$17.6 billion in 1992, for an average annual growth rate of 52%. The development of more ISDN applications should also be a major stimulant to its longer-term growth.
 - Integration among the various (voice, data, and graphics and image) can be done by several methods: By using special equipment such as multiplexers and TI switches; using PBXs in combination with public/private networks, including ISDN; and using value-added networks.
 - The principal benefits cited by users for this type of integration strategy is improved decision making, communications cost savings, improved quality of service, and the ability to implement new network applications, such as Electronic Data Interchange, which can provide the company a strategic advantage.
- The second type of network integration involves the building of gateways and other types of interfaces among data networks to provide for transparent access to data and applications across various operating systems and hardware platforms.
 - A particularly "hot" segment in this market sector is multivendor connectivity on a peer-to-peer communications basis, supporting the concept of cooperative processing.
 - Improvement in market penetration achieved by Digital Equipment is attributed in part to the company's integrated networking strategy and its use of a single operating system environment, which facilitates applications portability and communications.
 - Pressure for such multivendor, multisystem solutions has come in part from the increasing presence in Fortune 500 companies of a

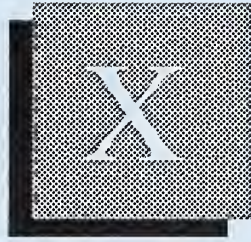
variety of information services solutions from a number of different vendors and the desire to integrate these disparate information resource environments into a cohesive network to improve corporate decision making.

- IBM's and Hewlett-Packard's recent announcements of their entry into the third-party service business, with the intent to service accounts with multivendor maintenance requirements, are also major indicators of the trend to multivendor MIS departments.
- The increasing implementation of standards and open systems solutions further encourages the use of multivendor strategies within various enterprises.
- The federal government's endorsement of OSI (Open Systems Interconnect) standards in future procurement programs with the DoD GOSIP (Government OSI Profile) mandate is a major stimulant for system integrators providing transition solutions to OSI.

Interesting recent developments in this area include:

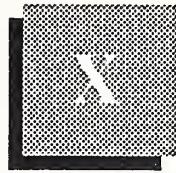
- IBM's Systems Applications Architecture (SAA) is a recent development program to offer a congruent collection of software interfaces, conventions, and protocols to provide a framework for applications systems across the different IBM operating systems and architectures. The first products from IBM incorporating SAA are the AS/400 departmental computing series and the OS/2 Extended Edition. Significant elements of SAA that address the issue of intersystem application and file sharing include:
 - A common programming interface, which includes languages and tools for application development
 - Communications tools and interfaces that will allow the various tiers of IBM platforms to communicate with each other
 - Common user access conventions and standards to describe screens, support user interaction, and describe hardware layouts of keyboards
- The publication of the CL/1 (TM) Connectivity Language Description, by Network Innovations Corp., an Apple Computer subsidiary, will allow packaged software developers to write applications that can access data across various host operating systems, DBMS brands and network connections. The first CL/1 connection product provides transparent access from Macintosh applications to host data on Digital VAX systems. This also reflects Apple's and DEC's increasing interest in systems integration sales.

- The introduction of minicomputer and PC versions of 4GL NOMAD allows for cooperative processing across different platforms. Distributed tasks like menu and window management, data validation and report generation can be processed on a PC while the mainframe is simultaneously processing transactions against a shared data base.
- The formation of the Open Systems Foundation provides an open standard for the UNIX operating system, which includes such major computer systems vendors as IBM, DEC, HP, Honeywell Group Bull, Apollo, Nixdorf, Siemens, and N.V. Philips of the Netherlands among its founders.
- IBM's joining X/Open in 1988, an international consortium for providing a Common Applications Environment (CAE) for official de facto hardware and systems software standards X/Open, is intended to provide for application software portability through common user and programmer interfaces.



Professional Services Sector Analysis





Professional Services Sector Analysis

A

Professional Services Market, 1987

INPUT divides professional services into four delivery submodes: consulting, education and training, software development, and systems operations (facilities management of client-owned systems). In tracking professional services vendors in the public sector, INPUT further subdivides professional services into government and commercial groups.

The total market size for professional services revenues in 1987 was \$12.7 billion, compared to \$10.6 billion in 1986, reflecting an 20% annual growth rate. See Exhibit X-1.

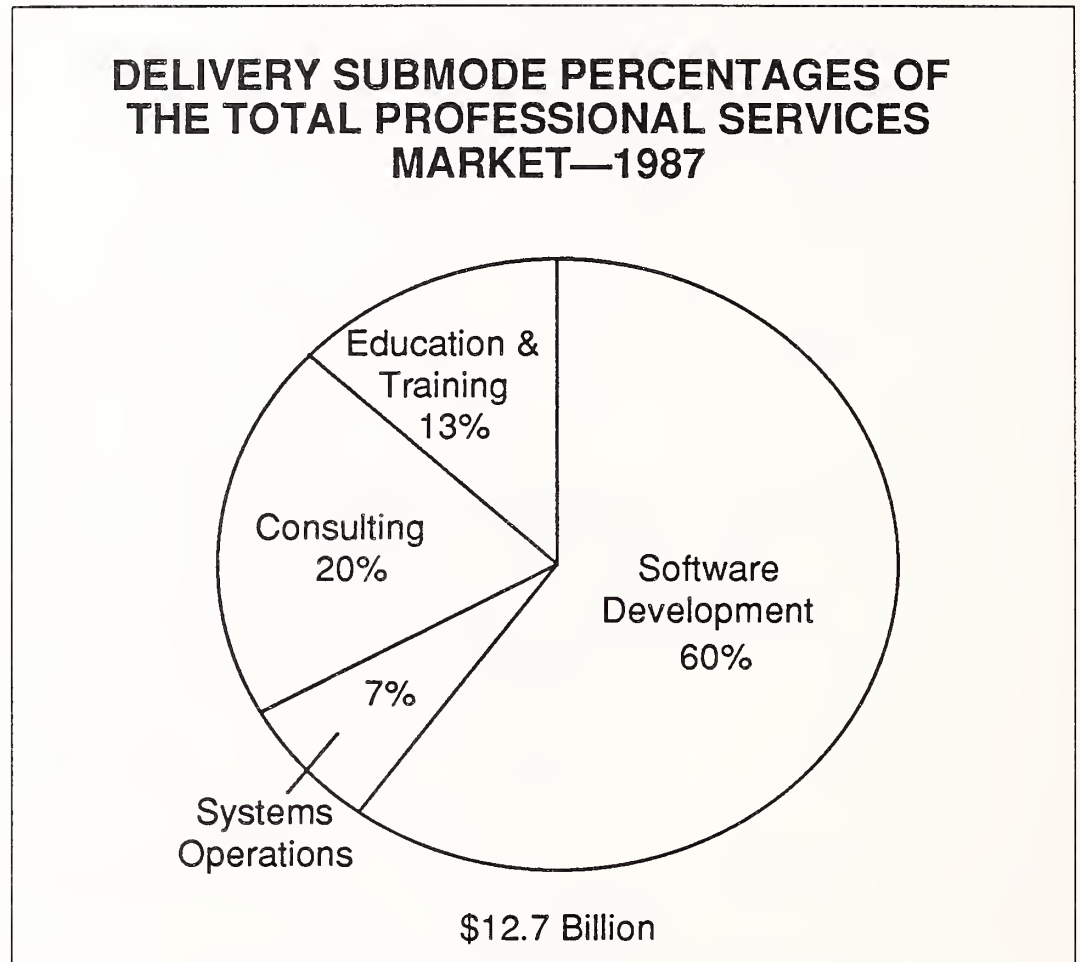
EXHIBIT X-1

PROFESSIONAL SERVICES MARKET BY DELIVERY SUBMODES, 1986-1987

Professional Services Market	Revenue Source by Delivery Submode (\$ Millions)				TOTAL
	Consulting	Education and Training	Software Development	Systems Operations	
1986	2,020	1,310	6,440	775	10,545
1987	2,516	1,635	7,548	1,020	12,719
Growth Rate (Percent)	25	25	17	32	20

In 1987, of the total professional services market, consulting services represented 20%, education and training 13%, software development, 60%, and systems operations 7%. See Exhibit X-2.

EXHIBIT X-2

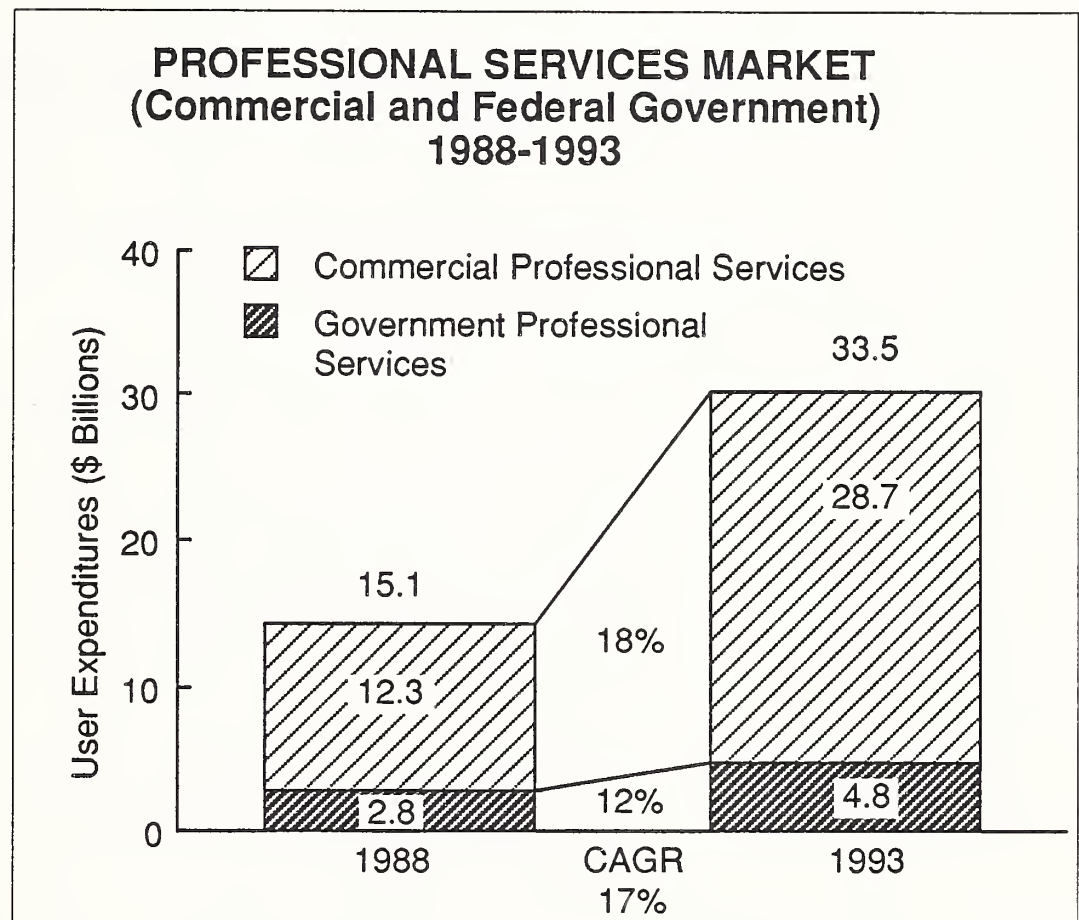


Forecast:

As shown in Exhibit X-3, INPUT forecasts that the total market for professional services will increase from \$15.1 billion in 1988 to \$33.5 billion in 1993, for a CAGR of 17%. The professional services market is expected to remain healthy, but decline slightly due to the diversion of revenues into systems integration.

The commercial segment of the total professional services market is expected to grow from \$12.3 billion in 1988 to \$28.7 billion in 1993, for an average annual growth rate of 17%.

EXHIBIT X-3



The federal government segment of professional services is projected to expand from \$2.8 billion in 1988 to \$4.8 billion in 1993, for a compound annual growth rate of 12%. The fastest-growing segments in federal government professional services will be software development and consulting.

The number of federal government agencies using professional services is expected to increase due to the emphasis on new and expanded data services that exceed current staff capacity or, to a lesser extent, capabilities. Although use of consulting and education/training services will increase, there is considerable pressure to contain expenditure growth. Education/training (along with travel) may be hardest hit by this pressure.

In the overall professional services market, software development will continue to be the largest segment, and is expected to grow from \$8.8 billion in 1988 to \$18.7 billion in 1993, for a compound annual growth rate of 16%.

The two fastest-growing segments in the professional services will continue to be consulting and education and training. Consulting expenditures are expected to increase from \$3 billion in 1988 to \$8.1 billion in 1993 for a CAGR of 21%. The Education and Training market is anticipated to increase from \$1.9 billion in 1988 to \$4.6 billion in 1992 for a CAGR of 19%.

As shown in Exhibit X-4, driving forces which are continuing to positively impact growth in the total professional services market include the following:

- **Software/Processing/Turnkey Vendor Positioning:** All these vendors are beginning to offer professional services, usually as an extension of consulting services.
- **Vendor Alliances:** The joint capability is creating opportunities for doing larger, more exotic types of assignments.
- **Diminished Skilled Labor Pool:** With the shift in demographics toward an older population, a shortage of highly trained workers in certain specialty areas could develop. This will provide opportunities for professional services tasks to be performed by outside companies that can provide specialized skills, particularly as applications become more complex.
- **Project Control Methodologies:** Increased use of project management software as well as recent refinements in these methodologies are improving the efficiencies of providing professional services applications.
- **Lack of IS In-House Expertise and Rising Labor Costs:** With the increasing shortage of skilled personnel in the information services area and related rising labor costs, it is often much cheaper to use outside professional services rather than hiring permanent staff persons for such work.
- **Low-Cost Market Entry:** The low-cost market entry environment encourages new players.
- **Systems Complexity:** With the increasing complexity of many information services applications, the talent pool of many companies is not capable of addressing the diverse needs. As such, it becomes necessary to deal with outside suppliers.

EXHIBIT X-4

**PROFESSIONAL SERVICES
MARKET—DRIVING FORCES**

- Software/Processing/Turnkey Vendor Positioning
- Vendor Alliances
- Diminished Skilled Labor Pool
- Project Control Methodologies
- Lack of IS In-House Expertise
- Rising Labor Costs
- Low-Cost Market Entry
- Systems Complexity

Inhibiting forces that will continue to negatively impact growth in the total professional services, shown in Exhibit X-5, include:

- **Shortage of Trained Consultants:** The general shortage expected within the skilled labor force could also constrain the number of consultants available. However, companies such as Arthur Andersen are expending considerable amounts of money on training new, young consultants, and other professional services companies are expected to do the same.
- **Impact of the Switch to Systems Integration:** Many contracts that in the past would have been identified as professional services contracts are being identified for systems integration solutions, due in part to the growing acceptance of the term for many similar functions. This has the impact of reducing the potential market for professional services.
- **Loss of IS Management Control:** There is the perception on the part of some IS Managers that with the use of outside forces they could lose control of their operations.

EXHIBIT X-5

**PROFESSIONAL SERVICES MARKET—
INHIBITING FORCES**

- Shortage of Trained Consultants
- Impact of the Switch to Systems Integration
- Loss of IS Management Control

B**Professional Services
Market Competitive
Analysis**

See Exhibit X-6 for market share information on the total processing services market, including private and public vendors, commercial and federal government sectors. Revenue data represents only the professional services revenues for each company. The revenue figures reflect INPUT's estimates where specific information is not available from the vendor.

EXHIBIT X-6

MAJOR VENDORS' SHARES OF PROFESSIONAL SERVICES MARKET—1987

Company Name	1987 Revenue (\$ Millions)	Market Share (Percent)
IBM Corporation	1,017	7
CSC Corporation	521	4
MITRE Corporation	445	3
Arthur Andersen & Co.	437	3
Unisys Corporation	414	3
Planning Research Corp.	298	2
BDM International	286	2
Arthur D. Little, Inc.	285	2
TRW, Inc.	273	2
Grumman Data Systems	240	2

C

Commercial Professional Services Market and Trends

Systems integrators will continue to capture a portion of the traditional commercial professional services market. However, INPUT believes that the impact on the commercial professional services market will be considerably less than for the government professional services sector because the commercial systems integration market for professional services represented only 19% of the total professional services market in 1987.

However, the financial impact on the commercial professional services provider's revenues may be more severe because the systems integrator tends to work the closest with the larger corporations. Because of the nature of their work, they tend to have considerable influence over the information infrastructure of their customer base.

This arrangement would suggest that both the federal and commercial

systems integration market. Smaller professional services organizations, to maintain a competitive, quality offering in systems integration, may consider using more third party partners, which is similar to the strategy employed by most systems integrators. Or professional services firms could target their services to particular systems integrators looking for expertise in selected areas.

However, INPUT believes that there will continue to be numerous opportunities for all quality professional services, with the total services (non-systems-integration professional services) market projected to be \$15.1 billion in 1988, growing at a compound annual rate of 17% to \$33.5 billion in 1993.

In both DoD and civil agencies, the predominant applications for which professional services are contracted are those associated with general data processing in support of management /administrative requirements.

A trend affecting the lower end of the commercial professional services market is the expansion into this market segment by VARs that are seeking to enhance relationships and thereby revenues through offering additional services. Particular targeted professional services include consulting and custom software development.

D

Government Professional Services Market and Trends

The federal professional services market will continue to remain highly competitive. In addition, the market continues to be highly price sensitive, with narrowing profit margins. The federal government, however, has set aside many professional services opportunities for small business or 8(a) firms. While larger companies can teamup on many of these opportunities, new rules on subcontracting will limit their participation.

In addition, many companies that traditionally did not participate in this market are now beginning to play a major role. These include aerospace firms, Big Eight accounting firms, as well as a number of specialized niche vendors.

On the other hand, the market potential for outside professional services vendors for government agencies is enhanced by existing government data processing staff shortages, combined with federal budget deficit pressures to increase the efficiency of its data processing operations. In addition, the Reagan administration has encouraged outsourcing of many former in-house activities, including professional services.

Due principally to the large size of federal professional services/systems integration type contracts and the government's needs for solutions—as opposed to just components—it is the government professional services market that INPUT believes will be the most negatively affected by inroads of the large corporate systems integrators.

For the total professional services market (including government and commercial), the largest financial impact on these firms will be in their key product area, software development. INPUT believes that outside the SI market, professional services software development will grow at a 14% annual rate, while within SI projects, the growth will be 37%.

Applications areas in demand by DoD and civilian agencies that professional services vendors should continue to be able to support include administration (particularly financial programs), data management software, logistics support, office automation solutions, LANs, distributed processing, and centralized data base applications.

INPUT suggests that specialization in a unique industry or applications area may be a more successful approach into the systems integration market for the professional services vendor. Some suggested areas of specialization that currently look attractive include: UNIX-based solutions; networking and network management; integration of voice, data and image; security; and new storage technologies. In addition, the training market is also expected to show rapid expansion as a necessary means to fully implement SI projects.

E

Public Professional Services Company Revenue and Net Income Performance

Public Government Professional Services Vendors:

The revenue growth for public government professional services vendors has been relatively stable for the last few years. During 1984, as shown in Exhibits X-7 and X-8, growth slowed to 9%; however, in 1985, 1986, and 1987, growth was 13%, 16%, and 13%, respectively. Bolt Beranek and Newman had the highest revenue growth rate (42%) of all government professional services vendors during 1987.

Like the other segments of the information services industry, the government professional services segment has experienced more fluctuation in earnings growth than in revenue growth. Growth in earnings was 0%, 37%, 2%, 38%, and 4% during the past five consecutive years. The 4% growth rate in 1987 was primarily the result of Bolt Beranek and Newman's \$18.3 million loss taken during the second quarter. See Exhibit X-9.

The profit margin for the government professional services segment was 3% for 1987, which was negatively impacted by Bolt Beranek and Newman's writeoff in the second quarter.

EXHIBIT X-7

PUBLIC GOVERNMENT PROFESSIONAL SERVICES VENDOR PERFORMANCE, 1984-1987

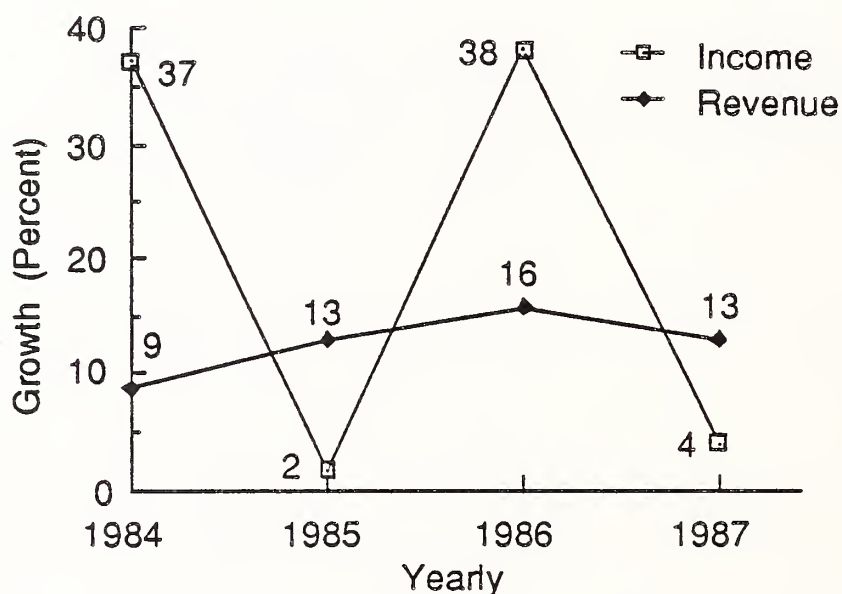


EXHIBIT X-8

REVENUES OF PUBLIC GOVERNMENT PROFESSIONAL SERVICES COMPANIES

COMPANY NAME	FISCAL YEAR END	REVENUE (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986		
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	% (+/-)	LAST 3 ROLLING QUARTRS	LAST 2 ROLLING QUARTRS
AM. MGMT. SYS.	12-31	29663	32798	35943	37117	135521	38089	41022	44652	50545	174308	29	29	30
BDM INTL	12-31	70663	79815	89535	82185	322198	80043	80278	75138	78580	314039	-3	-7	-10
BBN	06-30	45003	49324	48631	53653	196611	59100	72446 ¹	70200	78089	279835	42	46	45
C.A.C.I.	06-30	24912	26635	26097	29199	106843	29738	33797	34071	33655	131261	23	24	22
COMPUTER DATA	06-30	13684	13245	11839	12995	51763	13258	14846	16201	16802	61107	18	26	33
CSC	04-01	236787	233998	249428	257489	977702	290500 ²	274620	281254	287343	1153717	16	14	12
DYNAMICS RES.	12-25	17160	17819	17803	22410	75192	18363	21541	20982	30615	91501	22	26	28
INTERMETRICS	02-28	10184	11991	12714	11622	46511	11420	11280	12249	12009	46958	1	-2	0
LOGICOM	03-31	53587	50242	51598	49120	204547	53813	47900	53067	56703	211483	3	4	9
SOFTTECH	05-31	11327	13205	10691	10537	45760	9920	12374	10890	12299	45483	-1	3	9
STERLING S/W	09-30	58883 ³	56512	48900	45308	209603	45953	46763	52143	52094	196953	-6	0	11
TELOS	03-31	17920	19186	19509	20293	76908	20476	22042	24091	25821	92430	20	22	25
TOTALS		589773	604770	622688	631928	2449159	670673	678909	694938	734555	2779075	13	13	14

EXHIBIT X-9

NET INCOME OF PUBLIC GOVERNMENT PROFESSIONAL SERVICES COMPANIES

COMPANY NAME	FISCAL YEAR END	NET AFTER TAX INCOME (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
AM. MGMT. SYS.	12-31	902	1122	1488	1719	5231	1068	1313	1852	3349	7582	45	50	62
BDM INTL	12-31	2861	3490	3050	4184	13585	4564	5139	4512	5525	19740	45	42	39
BBN	06-30	2973	3418	3177	3364	12932	3735	-18305 ⁴	4127	4332	-6111	-147	-199	29
C.A.C.I.	06-30	105	477	455	706	1743	649	896	990	1028	3563	104	78	74
COMPUTER DATA	06-30	545	514	356	401	1816	387	617	836	861	2701	49	82	124
CSC	04-01	8863 ⁵	6652	7168	7580	30263	10835 ⁶	9457	9897	10311	40500	34	39	37
DYNAMICS RES.	12-25	514	546	590	806	2456	673	781	873	1401	3728	52	57	63
INTERMETRICS	02-28	383	247	43	157	830	30	420	472	602	1524	84	234	437
LOGICON	03-31	2541	2382	2162	2248	9333	-721 ⁷	2281	2455	2508	6523	-30	7	13
SOFTTECH	05-31	579	635	475	490	2179	-1627 ⁸	255	351	316	-705	-132	-42	-31
STERLING S/W	09-30	1924	2154	-2457 ⁹	1907	3528	1196	1672	1329	2436	6633	88	239	785
TELOS	03-31	87	776	698	660	2221	501	1125	1035	1089	3750	69	52	56
TOTALS		22277	22413	17205	24222	86117	21290	5651	28729	33758	89428	4	7	51

13 COMPANIES

Government Professional Services Footnotes

1. Bolt Beranek and Newman's revenue growth reflects the acquisitions of Delta Graphics, Inc. and Network Switching Systems, Inc. made in fiscal 1987.
2. Computer Sciences' principal growth area has been in federal systems and services, although revenue from all of its business sectors has grown.
3. Subsequent to Sterling Software's acquisition of Informatics, the company began divesting four of its divisions that no longer fit with its long-term objectives.
4. Bolt Beranek and Newman's loss included a \$22.4 million charge for development costs related to the acquisition of Network Switching Systems, Inc. and the issuance of stock warrants in conjunction with the formation of two research-and-development limited partnerships.
5. Computer Sciences' fiscal 1986 earnings dropped 14% from the previous fiscal year, due to a nonrecurring after-tax gain of \$8.7 million resulting from the sale of Paid Prescriptions during fiscal 1985.

6. Computer Sciences' fiscal 1987 earnings increase reflected improved operating margins and a decrease in corporate charges as a percent of sales.
 7. Logicon's loss was due to its decision to provide an additional \$5 million reserve for contract loss against fiscal 1987 earnings.
 8. SofTech's loss included a \$2.9 million write-off of a lease commitment related to previously divested SofTech Microsystems.
 9. Sterling Software's loss included a one-time charge against earnings of \$84.5 million for prepayment on debt.
-

Public Commercial Professional Services Companies:

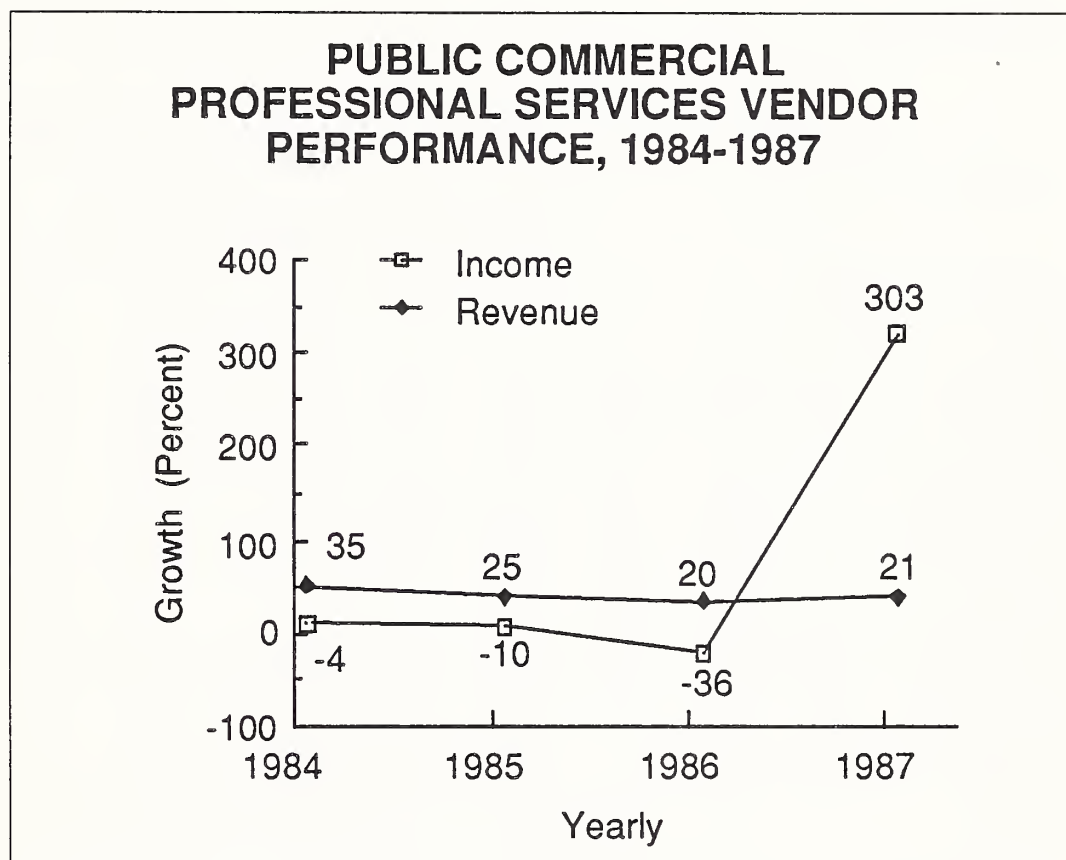
Commercial professional revenues have grown considerably faster than the government professional services segment during the past five years, although recent growth has slowed somewhat. Growth rates for the years 1985, 1986, and 1987 were 25%, 20%, and 21%, as shown in Exhibit X-10 and Exhibit X-11.

Earnings for the commercial professional services segment increased 406% for the year 1987, although the segment experienced an 890% drop in earnings during the fourth quarter. See Exhibit X-12.

AGS Computers, Analysts International, Continuum, and Data Architects performed well in terms of revenue and net income in 1987. 202 Data Systems, Advanced Computer Techniques (ACT) and Teknowledge each experienced a drop in revenue and net income for the year.

Profitability for the commercial professional services segment was 2% for the year 1987. Teknowledge's \$11.7 million loss adversely affected the already low margins secured by the group. Profitability is expected to increase for both the commercial and the government professional services segments as they mature.

EXHIBIT X-10



See Chapter IV of this report for more information on some of the more-successful public government and commercial professional services companies.

EXHIBIT X-11

REVENUES OF PUBLIC COMMERCIAL PROFESSIONAL SERVICES COMPANIES

COMPANY NAME	FISCAL YEAR END	REVENUE (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
202 DATA SYS	10-31	503	446	2287	109	3345	453	586	699	139	1877	-44	-50	-65
ACT	12-31	3452	3979	4392	3356	15179	3238	3655	2061 ¹	2037	10991	-28	-34	-47
AGS COMPUTERS	12-31	82571	89290	95398	114445 ²	381704	114895	114958	125535	141341	496729	30	28	27
ANALYSTS INTL	06-30	11586	12126	12048	13862	49622	15296	15495	16123	17052	63966	29	28	28
COMP. HORIZONS	02-28	12879	14151	14350	14633	56013	15342	16399	17503	19474	68718	23	24	28
COMP. TASK GRP	12-31	32711	35463	36518	38738	143430	39328	41139	43187	46398	170052	19	18	19
CONTINUUM	03-31	12247	14063	14077	14465	54852	15596	14482	18359	15422	63859	16	13	18
DATA ARCHITECT	11-30	5883	6650	6740	7812	27085	7492	8791	8945	9517	34745	28	29	27
KEANE	12-31	9821	9593	10438	10500	40352	10137	10139	10868	12361	43505	8	9	11
SYS. & COMP.	09-30	10469	10137	10224	10110	40940	9082	13876	8969	9663	41590	2	7	-8
TECHNALYSIS	12-31	3077	3213	3517	3719	13526	3564	3481	3781	3739	14565	8	5	4
TEKNOLEDGE	06-30	4019	4302	5357	5520	19198	4569	5023	4438	3809	17839	-7	-13	-24
TOTALS		189218	203413	215346	237269	845246	238992	248024	260468	280952	1028436	22	20	20

EXHIBIT X-12

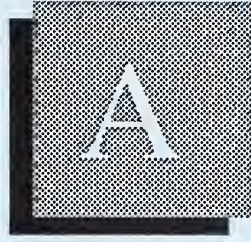
NET INCOME OF PUBLIC COMMERCIAL PROFESSIONAL SERVICES COMPANIES

COMPANY NAME	FISCAL YEAR END	NET AFTER TAX INCOME (\$ Thousands)										GROWTH (Percent)		
		1986					1987					1987/ 1986	LAST 3 ROLLING	LAST 2 ROLLING
		Q1	Q2	Q3	Q4	TOTAL	Q1	Q2	Q3	Q4	TOTAL	%(+/-)	QUARTRS	QUARTRS
202 DATA SYS	10-31	141	56	315	101	613	94	184	270	7	555	-9	-2	-33
ACT	12-31	136	289	215	60	700	124	44	49	-282 ³	-65	-109	-134	-185
AGS COMPUTERS	12-31	1580	2133	2310	2729	8752	2741	3560	3988	3869	14158	62	59	56
ANALYSTS INTL	06-30	-569	-345	-890	713 ⁴	-1091	724	893	703	735	3055	380	547	912
COMP. HORIZONS	02-28	508	513	526	616	2163	531	475	592	697	2295	6	7	13
COMP. TASK GRP	12-31	1331	1331	1160	1260	5082	1443	1142	1315	1210	5110	1	-2	4
CONTINUUM	03-31	-1354 ⁵	630	636	938	850	1023	517	1746	1187	4473	426	57	86
DATA ARCHITECT	11-30	344	401	353	537	1635	487	502	590	751	2330	43	43	51
KEANE	12-31	231	-181	4	229	283	271	212	144	256	883	212	1077	72
SYS. & COMP.	09-30	-9610	-749	-4323	-467	-15149 ⁶	-2228	3151	356	-586	693	105	153	95
TECHNALYSIS	12-31	207	244	294	311	1056	279	315	343	396	1333	26	24	22
TEKNOLEDGE	06-30	358	-310	308	503	859	-721	-2912 ⁷	-1311	-6717	-11661 ⁸	-1458	-2284	-1090
TOTALS		-6697	4012	908	7530	5753	4768	8083	8785	1523	23159	303	48	22

12 COMPANIES

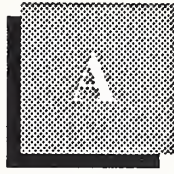
Commercial
Professional Services
Footnotes

1. ACT's decreased revenue represents a transfer of its software division to InterACT, a joint venture with LSI Logic.
2. AGS Computer attributed its revenue improvement to its banking software products group and its microcomputer distribution subsidiary, Microamerica. During the fourth quarter, the company completed the following acquisitions: Advanced Programming, Systemtech, and Vista Concepts.
3. ACT's loss results from the recognition of a loss on the company's interest in its joint venture with LSI Logic, in addition to a provision covering possible future losses which may result from a debtor being placed into receivership and from a client's default on an agreement with ACT's wholly-owned subsidiary, Creative Socio-Medics.
4. Analysts International attributed the improvement in net income to cost-cutting efforts and an infusion of new business. In addition, because of income tax credit carryforwards and a loss for the first part of the year, a tax credit was applied to pretax income during the fourth quarter.
5. Continuum's third and fourth quarter fiscal 1986 losses resulted from the underestimation of cost and time to complete the Client/Contract Administration System.
6. Systems and Computer Technology's first quarter loss included a \$14.9 million charge to operations for a class action litigation settlement, legal fees, and related expenses. This result largely accounted for the decrease in net income of the whole sector in first quarter 1986. The company's remaining losses were attributed to lower-than-expected revenues, particularly from new sales, due to the litigation and a changing marketplace.
7. Teknowledge's fiscal 1987 losses were due to lower than expected software product revenue, increased marketing and sales expenses, a \$1.1 million write-off of computer hardware and capitalized software costs, and approximately \$200,000 of nonrecurring expenses.
8. Teknowledge's loss was attributed to continued weakness in software products licensing revenues.



Appendix: Definition of Terms





Appendix: Definition of Terms

A

Revenue

- *Captive Computer Services Revenue* - Revenue received from users who are part of the same parent corporation as the vendors.
- *Noncaptive Foreign Computer Services Revenue* - Revenue received for computer services provided outside the U.S. from users who are not part of the same parent corporation as the vendors.
- *Noncaptive U.S. Computer Services Revenue* - Revenue received for computer services provided within the U.S. from users who are not part of the same parent corporation as the vendor.
- *Other Revenue* - Revenue derived from lines of business other than those defined above.
- *Total Company Revenue* - Revenue received from total computer services and other sources of revenue.
- *Total Computer Software and Services Revenue* - Revenue received from services provided by vendors that perform data processing using the vendors' computers (processing services), assist users to perform such functions on their own computers (software products and/or professional services), provide a combination of hardware and software integrated into a total system (turnkey systems), include consulting, education and training, programming analysis, and facilities management (professional services), provide for systems design, integration and installation (systems integration), or offer valued-added network services, electronic mail, electronic data interchange, or electronic information services (network services).

B

Service Modes

• *Processing Services*

- Transaction Services: uses vendor equipment and software at vendor-site or customer site, may be interactive or remote-batch-oriented.
- Utility Services: access to basic software tools enabling the users to develop their own problem solutions (language compilers, assemblers, DBMS, sorts, scientific library routines, etc).
- Other Services: carry-in batch processing, computer output microfilm services (COM), data entry services, disaster recovery/backup services.
- Systems Operations (Facility Management): vendor provides a complete operating information system for customer including equipment, software, personnel and facilities.

• *Professional Services* - Management consulting activity related to EDP systems consulting, production of custom software, education and training, and systems operations of client-owned computers (formerly identified as facilities management) where the vendor provides human resources to operate and manage the client facility.

• *Systems Integration* - delivery of large, multidisciplinary, multivendor systems, incorporating some or all of these functions: systems design, programming, integration, equipment, networks, installation and acceptance. Systems can encompass multiple product delivery modes.

• *Software Products*

- Systems software and/or applications software packages purchased by users.

- Systems Software Products

Systems Control Software: operating systems, communications monitors, network control, library control, windowing, access control, security, etc.

Data Center Management Software: capacity management, scheduling, job accounting, performance monitors, tape management, utilities, downtime repair monitoring management, etc.

Application Development Tools Software: application generators, assemblers, compilers, 4GL's, automated documentation, lan-

guages, translators, data base management systems, data dictionaries.

- ° Applications Software Products

Cross-Industry Applications Software: used by clients in many or all vertical markets (i.e.-payroll, word processing, spread sheets, accounts receivable).

Industry-Specific Applications Software: unique to a specific vertical market and sold into that market only (i.e., demand deposit accounting, MRP II, hospital patient tracking).

- *Network Services*

- Value-Added Networks (VANs): network transmission facilities, augmented with computerized switching and features such as packet switching, electronic mail, store-and-forward message switching, terminal interface and error detection and correction.
- Electronic Data Interchange (EDI): application-to-application electronic communication, based on established business document standards.
- E-Mail: a range of services that transmits documents consisting of text and graphic material to be read by a person—with the quality of document being high.

- *Electronic Information Services*

- Data bases that provide specific information via terminal-based inquiry such as stock prices, legal precedents, economic indicators, airline schedules, etc.
- News services that offer current information, either general or for a specific category; i.e., financial or political
- Videotex services that provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, etc.
- *Turnkey Systems* - an integration of systems software, packaged or customized applications software, CPU, equipment, and peripherals. These systems are developed to meet a specific set of user requirements. The value added by the vendor is primarily in the software, either packaged or custom developed. Most CAD/CAM systems and many small business systems are turnkey systems. This does not

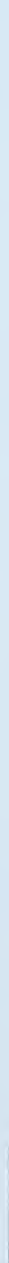
include specialized hardware systems such as word processors, cash registers, and process control systems.

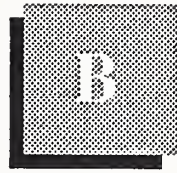
C**Public
Information**

- *Profit Margins*—Profits after tax and extraordinary items.
- *Revenue Growth*—Derived from one or more of the following:
 - *Acquisitions*—Proportion of revenue increase derived from the acquisition of other companies.
 - *Price Increase*—Proportion of revenue increase derived solely from increasing the price of services.
 - *Real Growth*—Proportion of revenue increase derived from all sources net of the effect of price increases and acquisitions.



Appendix: Reconciliation





Appendix: Reconciliation

The same basic research methodology was used to size the information services industry vendor revenues and user expenditures in 1987 as in previous years. An elaboration on this methodology is included in Chapter I of this report.

However, in the 1987 Information Services Industry Survey, two new delivery modes were added to the four modes measured in the 1986 survey. These were systems integration and network services. Professional services was subdivided into professional services and systems integration, and processing services into processing services and network/electronic information services. The turnkey systems delivery mode was also expanded to include VARs that provide turnkey systems solutions.

The effect of these changes on the total number of companies identified as having a majority of revenue in one of the seven delivery modes making up the information services industry include:

- A reduction in the number of processing services companies by 200 companies, representing the deduction of network/electronic information services companies
- An increase of approximately 125 companies, predominantly network/electronic services providers, reflecting newly identified companies
- A reduction in the number of professional services companies by 300, reflecting the move of a like number of companies to the systems integration category, plus a 5% increase in professional services companies representing new market entrants;
- A 10% increase in the number of software companies, also representing new companies; and

- An 8% increase in the number of turnkey systems/VAR companies identified as primarily turnkey systems suppliers with the inclusion of the larger VARs for the first time in the 1987 market survey.

A

Change in Number of
Companies, 1986-
1987

Predominant Delivery Mode	No. of Comp. 1986	No. of Comp. 1987
Processing Services	2,110	1,900
Software Products	2,705	2,970
Professional Services	1,555	1,320
Systems Integration	N/A	300
Turnkey Systems/VARs	1,162	1,255
Network Services	N/A	325
Total No. of Co.	7,532	8,070
Total U.S. Revenues (\$Billions)	54.0	*65.0

*Includes approximately \$2 billion of systems integration equipment revenue not included in the 1986 market survey.

INPUT does not survey companies with revenues of less than \$250,000.

B

Change in 1987
Actual Market Size
Numbers from 1987
Forecast

In its *1987 Information Services Industry Report*, INPUT forecasted that the total federal government and commercial information services market (user expenditures) in 1987 would total \$64 billion. The 5% increase in the 1987 market size (\$67 billion) figure in INPUT's *1988 Information Services Industry Report*, from actual survey results conducted in 1988, reflects the following factors:

- A stronger than expected general economy
- Some modest changes in factors used to convert vendor revenues into user expenditures
- Additional companies in the network services and turnkey systems delivery modes not captured in the 1986 industry survey



Appendix: Questionnaire

Information Services Industry Vendor Questionnaire

I. Company Background Data

Company name: _____

Headquarters address: _____

Respondent Name and Title: _____

CEO Name _____ Headquarters telephone: () _____

Number of employees associated with information services activities:

Marketing/Sales _____

Computer Operations _____

Research & Development _____

Customer Support _____

Finance/Admin. _____

IS Total _____

Company Total _____

Please provide a brief statement of the principal business of your firm.

II. Revenues

A. Please indicate annual revenues for United States, noncaptive information services (revenues from sources outside your own corporate structure).

	Fiscal Year Ending____/86 Mo	Fiscal Year Ending____/87 Mo	Fiscal Year Projection Ending____/88 Mo
Revenues - (\$ Millions)	\$M	\$M	\$M
Revenue Growth % From Previous Year: Total			
	%	%	%
• From price increases	%	%	%
• From acquisition	%	%	%
• From new products	%	%	%
• From sales volume	%	%	%

B. Percent of Noncaptive Prior Year U.S. Revenues from Following Delivery Modes
(See Definitions Attached):

Application Software Products	_____%	Turnkey Systems	_____%
Systems Software Products	_____%	Professional Services	_____%
Processing Services	_____%	Systems Integration	_____%
Network and Electronic Information Services	_____%		

C. Percent of Prior Year's Revenues From:

United States	_____%	Canada	_____%	Europe	_____%	Asia Pacific (Total)	_____%
Japan (only)	_____%	Latin America	_____%	Other	_____%		

III. Additional Corporate Information

Year company was incorporated or founded: _____

Ownership: ☐ Public ☐ Private ☐ Owned by another company

If owned by another organization, please indicate legal relationship with parent:

☐ Subsidiary ☐ Division Other: _____

Parent company's name: _____

Subsidiary Operations:

Please provide the following information for all active subsidiaries or divisions owned by your company that are engaged in information services activities.

Name of Company: _____

Headquarters Address: _____

City, State, Zip: _____

President's Name: _____

Telephone Number: () _____

On the following pages, please provide additional information for those service delivery modes applicable to your business.

Please send us your product literature for our files and reference use, and add INPUT to your mailing list for press releases and financial reports. Thanks very much for your assistance.

IV.

A. Application Software Products

Please indicate the percentage of your U.S. last year's revenue from application software products. (Total for Section 1 should equal 100% of those revenues. Total for Section 2A plus 2B should also be 100%.)

Revenue Growth Last Year: _____%

1. Applications Software Products..... _____%

- Mainframe..... _____%

- Minicomputer..... _____%

- Workstation/PC _____%

100%

2A. Revenues from Vertical Markets
(Based on U.S. Dept. of Commerce SIC Codes)

Discrete Manufacturing _____%

Process Manufacturing _____%

Transportation _____%

Utilities _____%

Telecommunications _____%

Retail Distribution _____%

Wholesale Distribution _____%

Banking and Finance _____%

- Commercial Banks _____%

- Savings/Thriffs _____%

- Brokerage _____%

- Other _____%

Insurance _____%

- Life/Health _____%

- Property/Casualty _____%

- Agency _____%

Medical _____%

- Hospitals _____%

- Physicians/Clinics _____%

- Other _____%

Education _____%

Services (lawyers, accountants, etc.) _____%

Federal Government _____%

- DoD _____%

- Civil _____%

State/Local Government _____%

- State _____%

- Local _____%

Other (construction, non-profit) _____%

Consumer, Home Usage _____%

2B. Revenues from Cross-Industry Markets

Planning/Analysis/ _____%

Spreadsheets _____%

Accounting _____%

Education/Training _____%

Human Resources _____%

Engineering/Scientific _____%

Office Systems (Word Processing, E-Mail, Calendar, etc.) _____%

Sales/Marketing _____%

Publishing Systems _____%

Graphics _____%

Other _____%

B. Systems Software Products

Please indicate the percentage of your U.S. last year's revenue from systems software products. (Total for Section 1 should equal 100% of those revenues. Total for Section 2 should also be 100%.)

Revenue Growth Last Year: _____%

1. Systems Software.....%

a. Systems Control%

- Mainframe%

- Minicomputer.....%

- Workstation/PC%

100%

b. Data Center Management

Tools.....%

- Mainframe%

- Minicomputer%

- Workstation/PC%

100%

c. Application Development

Tools.....%

100%

- Mainframe%

.....% - Minicomputer

.....% - Workstation/PC%

100%

2. Revenues from Vertical Markets

(Based on U.S. Dept. of Commerce SIC Codes)

Discrete Manufacturing	_____%	Federal Government	_____%
Process Manufacturing	_____%	- DoD	_____%
Transportation	_____%	- Civil	_____%
Utilities	_____%	State/Local Government	_____%
Telecommunications	_____%	- State	_____%
Retail Distribution	_____%	- Local	_____%
Wholesale Distribution	_____%	Other (construction, non-profit)	_____%
Banking and Finance	_____%	Consumer, Home Usage	_____%
- Commercial Banks	_____%		100%
- Savings/Thriffs	_____%		
- Brokerage	_____%		
- Other	_____%		
Insurance	_____%		
- Life/Health	_____%		
- Property/Casualty	_____%		
- Agency	_____%		
Medical	_____%		
- Hospitals	_____%		
- Physicians/Clinics	_____%		
- Other	_____%		
Education	_____%		
Services (lawyers, accountants, etc.)	_____%		

C. Processing Services

Please indicate the percentage of your U.S. last year's revenue from processing services. (Total for Section 1 should equal 100% of those revenues. Total for Section 2A plus 2B should also be 100%.)

Revenue Growth Last Year: _____%

- 1. Processing Services** _____%
- a. Processing Services..... _____%
- Transaction Services _____%
- Utility Services..... _____%
- Other Services..... _____%
- 100%
- b. Systems Operations (facilities management of vendor-owned systems) _____%
- 100%

2A. Revenues from Vertical Markets (Based on U.S. Dept. of Commerce SIC Codes)

Discrete Manufacturing	_____%
Process Manufacturing	_____%
Transportation	_____%
Utilities	_____%
Telecommunications	_____%
Retail Distribution	_____%
Wholesale Distribution	_____%
Banking and Finance	_____%
- Commercial Banks	_____%
- Savings/Thriffs	_____%
- Brokerage	_____%
- Other	_____%
Insurance	_____%
- Life/Health	_____%
- Property/Casualty	_____%
- Agency	_____%
Medical	_____%
- Hospitals	_____%
- Physicians/Clinics	_____%
- Other	_____%
Education	_____%
Services (lawyers, accountants, etc.)	_____%
Federal Government	_____%
- DoD	_____%
- Civil	_____%
State/Local Government	_____%
- State	_____%
- Local	_____%
Other (construction, non-profit)	_____%
Consumer, Home Usage	_____%

2B. Revenues from Cross-Industry Markets

- Utility Services	_____%
- Other Services	_____%
Computer Output Microfilm	_____%
Data Entry	_____%
Disaster Recovery	_____%
Carry-In Batch	_____%
All Other	_____%
100%	
Planning/Analysis/Spreadsheets	_____%
Accounting	_____%
Education/Training	_____%
Human Resources	_____%
Engineering/Scientific	_____%
Office Systems (Word Processing, E-Mail, Calendar, etc.)	_____%
Sales/Marketing	_____%
Publishing Systems	_____%
Graphics	_____%
Other	_____%

D. Network Services

Please indicate the percentage of your U.S. last year's revenue from network services.
(Total for Section 1 should equal 100% of those revenues. Totals for Section 2A plus 2B should also be 100%.)

Revenue Growth Last Year: _____%

1. Network/Electronic Information Services

A. Network Services	_____%
- Value-Added Network Services (VANS)	_____%
- Electronic Mail	_____%
- Electronic Data Interchange (EDI)	_____%
	100%
B. Electronic Information Services (EIS)	_____%
	100%
- Databases	_____%
- News	_____%
- Videotex	_____%
	100%

2A. Revenues from Vertical Markets (Based on U.S. Dept. of Commerce SIC Codes)

Discrete Manufacturing	_____%
Process Manufacturing	_____%
Transportation	_____%
Utilities	_____%
Telecommunications	_____%
Retail Distribution	_____%
Wholesale Distribution	_____%
Banking and Finance	
- Commercial Banks	_____%
- Savings/Thriffs	_____%
- Brokerage	_____%
- Other	_____%
Insurance	
- Life/Health	_____%
- Property/Casualty	_____%
- Agency	_____%
Medical	
- Hospitals	_____%
- Physicians/Clinics	_____%
- Other	_____%
Education	_____%
Services (lawyers, accountants, etc.)	_____%
Federal Government	
- DoD	_____%
- Civil	_____%
State/Local Government	
- State	_____%
- Local	_____%
Other (construction, non-profit)	_____%
Consumer, Home Usage	_____%

2B. Revenues from Cross-Industry Markets

VANS	_____%
Electronic Mail	_____%
EIS Data Bases	
- Credit	_____%
- Securities	_____%
- Others	_____%

E. Turnkey Systems

Please indicate the percentage of your U.S. last year's revenue from turnkey systems.
(Total for Section 1 should equal 100% of those revenues. Totals for Section 2A plus 2B should also be 100%.)

	Revenue Growth Last Year _____%
1. Turnkey Systems	_____%
a. Equipment.....	_____%
- Mainframe	_____%
- Minicomputer	_____%
- Workstation/PC.....	_____%
	100%
b. Packaged Software	_____%
c. Customized Software.....	_____%
d. Other (Education, Training,	_____%
Professional Services)	

2A. Revenues from Vertical Markets (Based on U.S. Dept. of Commerce SIC Codes)

Discrete Manufacturing	_____%
Process Manufacturing	_____%
Transportation	_____%
Utilities	_____%
Telecommunications	_____%
Retail Distribution	_____%
Wholesale Distribution	_____%
Banking and Finance	
- Commercial Banks	_____%
- Savings/Thriffs	_____%
- Brokerage	_____%
- Other	_____%
Insurance	
- Life/Health	_____%
- Property/Casualty	_____%
- Agency	_____%
Medical	
- Hospitals	_____%
- Physicians/Clinics	_____%
- Other	_____%
Education	_____%
Services (lawyers, accountants, etc.)	_____%
Federal Government	
- DoD	_____%
- Civil	_____%
State/Local Government	
- State	_____%
- Local	_____%
Other (construction, non-profit)	_____%
Consumer, Home Usage	_____%

2B. Revenues from Cross-Industry Markets

Planning/Analysis/	
Spreadsheets	_____%
Accounting	_____%
Education/Training	_____%
Human Resources	_____%
Engineering/Scientific/	
CAD-CAM	_____%
Office Systems (Word Processing, E-Mail, Calendar, etc.)	_____%
Sales/Marketing	_____%
Publishing Systems	_____%
Graphics	_____%
Other	_____%

F. Professional Services

Please indicate the percentage of your U.S. last year's revenue from professional services. (Total for Section 1 should equal 100% of those revenues. Total for Section 2 should also be 100%.)

	Revenue Growth Last Year _____%
1. Professional Services	_____%
- Consulting.....	_____%
- Education & Training	_____%
- Software Development.....	_____%
- Systems Operations (facilities management of client-owned systems)	_____%
	100%

2. Revenues from Vertical Markets

(Based on U.S. Dept. of Commerce SIC Codes)

Discrete Manufacturing	_____%
Process Manufacturing	_____%
Transportation	_____%
Utilities	_____%
Telecommunications	_____%
Retail Distribution	_____%
Wholesale Distribution	_____%
Banking and Finance	
- Commercial Banks	_____%
- Savings/Thriffs	_____%
- Brokerage	_____%
- Other	_____%
Insurance	
- Life/Health	_____%
- Property/Casualty	_____%
- Agency	_____%
Medical	
- Hospitals	_____%
- Physicians/Clinics	_____%
- Other	_____%
Education	_____%
Services (lawyers, accountants, etc.)	_____%
Federal Government	
- DoD	_____%
- Civil	_____%
State/Local Government	
- State	_____%
- Local	_____%
Other (construction, non- profit)	_____%
Consumer, Home Usage	_____%
	100%

G. Systems Integration

Please indicate the percentage of your U.S. last year's revenue from systems integration. (Total for Section 1 should equal 100% of those revenues. Total for Section 2 should also be 100%.)

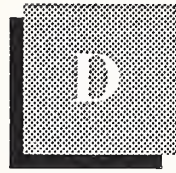
	Revenue Growth Last Year _____%
1. Systems Integration	_____%
- Equipment	_____%
- Packaged Software	_____%
- Customized Software	_____%
- Professional Services	
(For Systems Integration Only)	_____%
	100%

2. Revenues from Vertical Markets (Based on U.S. Dept. of Commerce SIC Codes)

Discrete Manufacturing	_____%
Process Manufacturing	_____%
Transportation	_____%
Utilities	_____%
Telecommunications	_____%
Retail Distribution	_____%
Wholesale Distribution	_____%
Banking and Finance	
- Commercial Banks	_____%
- Savings/Thriffs	_____%
- Brokerage	_____%
- Other	_____%
Insurance	
- Life/Health	_____%
- Property/Casualty	_____%
- Agency	_____%
Medical	
- Hospitals	_____%
- Physicians/Clinics	_____%
- Other	_____%
Education	_____%
Services (lawyers, accountants, etc.)	_____%
Federal Government	
- DoD	_____%
- Civil	_____%
State/Local Government	
- State	_____%
- Local	_____%
Other (construction, non- profit)	_____%
Consumer, Home Usage	_____%
	100%



Appendix: Related INPUT Reports



Appendix: Related INPUT Reports

- *Company Analysis Monitoring Services (CAMS) Company Directory*
- *Information Services Industry-Specific and Cross Industry Markets*
- *U.S. Processing Services Markets, 1988-1993*
- *U.S. Network Services Markets, 1988-1993*
- *U.S. Software Products Markets, 1988-1993*
- *U.S. Professional Services Markets, 1988-1993*
- *U.S. Turnkey Systems Markets, 1988-1993*
- *U.S. Systems Integration Markets, 1988-1993*
- *Vendor Financial Watch, published quarterly.*
- *U.S. EDI Services, 1988-1993*
- *Federal Government Professional Services Market*
- *European Information Services, 1987-1993*
- *Emerging Network Services*
- *CASE Markets*
- *Large-Systems User Requirements*

- *Small-Systems User Requirements*
- *TPM Service Requirements*
- *Small-Systems Vendor Analysis*
- *IBM Systems Application Architecture*
- *Impact of Systems Integration*
- *Alternate Distribution Channels*

